Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Review of the Section 251 Unbundling	)	
Obligations of Incumbent Local	)	CC Docket No. 01-338
Exchange Carriers	)	
	)	
Implementation of the Local Competition	)	
Provisions in the Telecommunications	)	CC Docket No. 96-98
Act of 1996	)	
	)	
Deployment of Wireline Services	)	
Offering Advanced Telecommunications	)	CC Docket No. 98-147
Capability	)	

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Prepared for and Submitted by
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I. COMPETITIVE OVERVIEW

The Commission conducted its last comprehensive review of local exchange competition in 1999. Since that time, CLEC customer bases have been growing at significant rates, more than tripling in the last three years. ILECs are losing roughly an equal number of lines to wireless and cable networks as they are to wireline CLECs. At least 10 million wireline access lines already have migrated to wireless networks, and several million more have migrated to cable networks. For three years running, the number of lines served by ILECs has declined – a trend never witnessed before in a century of growth of telephone service. And competitive alternatives are available to far greater numbers than are actually subscribing today.

A. Competitive Facilities and Networks.

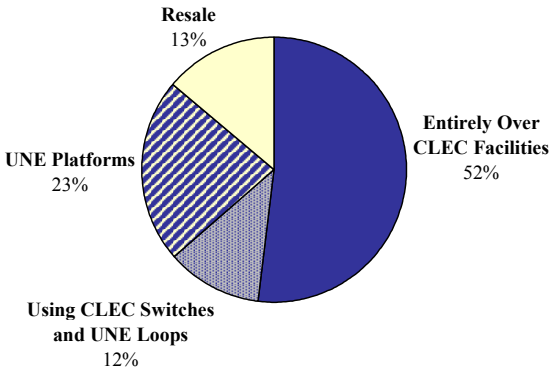
The competitive networks of CLECs, wireless carriers, and broadband providers have all grown significantly in the three years since the Commission conducted its last comprehensive UNE review. *See* Table 1. The number of cities with CLEC networks has increased by more than 70 percent, CLEC fiber has grown by more than 80 percent, CLEC circuit switches and packet switches have both nearly doubled, and buildings served by CLECs have more than tripled. *See id*. CLECs now serve more lines using entirely their own facilities (including their own local switches and loops) than they do by relying entirely on ILEC networks (through resale or the UNE Platform). *See* Figure 1. All of these figures are conservative, because they are drawn from public sources or from the necessarily limited data available to the BOCs.

Table 1. Competitive Networks

		YE 1998	YE 2001
Wireline CLECs	Cities with Voice Networks	540	930
	Circuit Switches	700	1,300
	Packet Switches	860	1,700
	Route Miles of Fiber (local and long-haul)	100,000	184,000
	Average Number of CLEC Networks in Top 100 MSAs	10	16
	Buildings Served (on- and off-net)	106,000	330,000
	Homes with access to cable telephony service	<2,000,000	>10,000,000
Wireless	% of population in counties with 3 or more wireless operators	n/a	>91
	% of population in counties with 5 or more wireless operators	n/a	>75
	Wireless Carriers Offering Data Services	2	7
Broadband	% of homes with access to cable modem service	20	66-77
	% of homes with access to two-way satellite	0	>90
	Markets with MMDS	0	58

Sources: See Appendix M.

Figure 1. Breakdown of CLEC Lines by Mode of Entry*



*The number of lines provided entirely over CLEC facilities and using CLEC switches is based on the number of E911 listings CLECs have obtained. Because the actual number of lines that CLECs are serving with their own switches is likely much higher, this method will, if anything, understate the percentage of all lines that CLECs are serving in whole or in part over facilities they have deployed themselves. The number of lines that CLECs are serving entirely over CLEC facilities was derived by subtracting the total number of stand-alone POTS loops from the total number of CLEC E911 listings.

Switches.[1] At the time of the last UNE review, CLECs had deployed approximately 700 traditional local circuit switches. Today, CLECs operate approximately 1,300 *known* local circuit switches. CLECs are now using their switches to serve no fewer than *16 million* local lines, and *likely closer to 23 million* local lines, a more than three-fold increase since 1998. CLEC switches are now so geographically widespread that they are being used to serve actual local customers in wire centers that contain approximately *86 percent* of the Bell companies' access lines.

CLECs are using their switches to serve mass-market customers as well as large business customers. As of year-end 2001, CLECs were serving at least *three million* residential lines using their own switches, and were offering service to millions more. Circuit-switched cable telephony has been deployed in 20 states and is now available to more than 10 million U.S. homes – approximately 10 percent of the mass market. Cable telephony is now available ubiquitously in some smaller states (*e.g.*, Cox service in Rhode Island) and to a large and growing fraction of homes in a number of larger states (*e.g.*, AT&T service in and around Pittsburgh, Boston, Chicago, and the Bay Area, and Cox service in San Diego, Orange County, and the Tidewater area of Virginia).

Packet and wireless switches are now placing significant, additional competitive pressure on the ILECs' traditional circuit switches. Some eight million users now have broadband cable or wireless data links that terminate directly on a competitive packet switch, bypassing ILEC circuit switches altogether. Since the last UNE review, the installed base of the CLECs' *known* packet switches has nearly doubled, from 860 to more than 1,700. The number of wireless subscribers has increased from about 69 million as of year-end 1998, to an estimated 130 million today. A rapidly growing number of subscribers are using wireless service as a substitute for second and additional lines, and some consumers have abandoned wireline service entirely in favor of wireless. And wireless switches are displacing *usage* on wireline switches even more

[1] *See* Section II.

rapidly. Wireless carriers have deployed hundreds of switches, which handle an estimated 12 percent of all U.S. phone calls.

Interoffice Transport.[2] It is clearly economical for competitors to run fiber-optic networks to a large fraction of ILEC wire centers. Since the time of the last UNE review, CLECs have increased their fiber networks from approximately 100,000 route miles to at least 184,000 route miles, and the majority of this fiber is used for local transport. The number of CLEC networks in the 150 largest MSAs – which encompass nearly 70 percent of the U.S. population – has grown from approximately 1,100 to approximately 1,800 in the last three years. Local fiber also is now being supplied to CLECs by carrier-agnostic wholesale suppliers, utility companies, and interexchange carriers. CLECs are now using their own fiber networks to capture between 28 and 39 percent of all revenues for special access services, which are provided through a combination of transport and high-capacity loops.

CLECs that provide competitive transport typically do so by collocating transmission equipment in an ILEC central office and connecting that equipment to their own fiber-optic network. This "fiber-based collocation" supplies the simplest and most unambiguous indicator of the extent of competition in the transport market. As of year-end 2001, one or more CLECs had obtained fiber-based collocation in BOC wire centers that contain more than half of all business lines served by the Bell companies. As of that same date, one or more CLECs had obtained fiber-based collocation in more than 60 percent of all BOC wire centers with more than 10,000 business lines. These figures are highly conservative because, with all the competitive fiber that has been deployed, a considerable amount of traffic also now bypasses ILEC wire centers completely.

High-Capacity Loops.[3] CLEC fiber networks now pass through a large number of commercial office buildings, which contain an even larger number of high-volume customers. CLECs now serve at least 156 million voice-grade equivalent circuits, the majority of which are provided over high-capacity lines. And CLEC fiber networks are now so extensive that they readily can be – and routinely are – extended as needed to pick up additional traffic from new, off-net customers. CLECs accordingly serve the vast majority of their customers using their own last-mile facilities. For example, CLECs serve between four and seven times more business customers over high-capacity fiber that the CLECs own themselves, than they do over loops obtained from ILECs. CLECs have purchased only 70,000 high-capacity loops in the four BOCs' regions combined. Virtually all of the high-capacity loops that CLECs have purchased are DS-1 loops; CLECs have purchased only 140 DS-3 loops, and not a single loop above the DS-3 level.

POTS Loops.[4] Technologies that compete directly against traditional POTS loops are rapidly being deployed across the country. Cable telephony services were available in only a few markets at the time of the last UNE review. Today, they have been expanded to the point where they are now offered to more than 10 percent of all U.S. homes; that figure is projected to

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[2] *See* Section III.

[3] *See* Section IV.A.

[4] *See* Section IV.B.

rise rapidly over the next few years. As noted above, cable telephony is now available ubiquitously in some smaller states and to a large and growing fraction of homes in a number of larger states.

Wireless services compete much more significantly against wireline than they did at the time of the last UNE review. The quality of wireless services has improved significantly in the last three years, and prices have dropped dramatically. More than 90 percent of the U.S. population now lives in counties served by three or more mobile wireless operators; more than three-quarters of the population live in counties served by five or more. Two in five Americans have a mobile phone.

Broadband Loops.[5] Broadband loops represent an increasing share of all loops provided to mass-market customers – more than 6 percent as of year-end 2001. Broadband cable modem service is now available to more than two-thirds of the residential population. Cable operators serve more than twice the number of broadband subscribers as ILEC networks, and satellite and fixed wireless providers offer additional competition. Two satellite providers now offer two-way broadband service nationwide. Broadband wireless services also are much more widely available today than they were three years ago.

Interconnection of Competitive Networks and ILEC Networks. Since the last UNE review, CLECs have significantly increased the level of interconnection between their networks and ILEC networks, and the amount of traffic exchanged between them. *See* Table 2. The number of CLEC collocation arrangements has grown nearly six-fold since the Commission conducted the last UNE review. *See id.* End offices serving more than 80 percent of all BOC access lines now have one or more CLEC collocators.[6] The number of CLEC interconnection trunks has more than quadrupled since the last UNE review. *See* Table 2. Minutes of traffic exchanged on these trunks have increased by about five-fold. *See id.*

Table 2. Interconnection of CLEC and ILEC Facilities

	Collocation Arrangements		Interconnection Trunks		Minutes Exchanged	
	1998	**2001**	**1998**	**2001**	**1998**	**2001**
Verizon*	1,100	7,000	663,000	3.4 million	32 billion	193 billion
SBC**	2,000	9,900	541,000	3.1 million	23 billion	125 billion
BellSouth	870	4,700	326,000	1.3 million	21 billion	98 billion
Qwest	240	3,300	285,000	927,000	20 billion	78 billion
Total	**4,300**	**24,900**	**2 million**	**9 million**	**96 billion**	**493 billion**

Totals may not equal sum of parts due to rounding. *1998 collocation arrangements exclude the former GTE service area. Minutes exchanged data exclude CLEC-terminated minutes for the former GTE service area. **1998 minutes exchanged data exclude the Ameritech service area.

[5] *See* Section IV.C.

[6] *See* Section II.A, Table 10.

B. Competitive Lines Served.

Since the last UNE review, CLECs, wireless, and broadband providers have very significantly increased the number of customers and lines that they serve. *See* Table 3. There has been especially large growth in the number of lines that CLECs serve with their own facilities. By contrast, ILEC access lines have steadily declined in each of the last three years, an unprecedented trend in a century of steady annual growth. *See* Figure 2.

CLECs serve no fewer than 16 million lines and likely closer to 23 million lines – including approximately three million residential lines – wholly or partially over facilities they have deployed themselves, facilities that invariably include their own local switches.[7] These line totals represent a more than three-fold increase since 1998, and a more than thirty-fold increase in facilities-based residential lines. Many of the lines that CLECs serve are high-capacity lines; CLECs now serve at least 156 million voice-grade equivalent circuits.[8] CLECs also serve more than 9 million lines – including more than 5 million residential lines – via resale of ILEC service or through the UNE Platform. The corresponding figures three years ago were approximately 2.7 million CLEC lines, including 1.5 million residential lines. Today, the largest CLECs serve more than one million access lines each, and large numbers of CLECs serve 500,000 or more. *See* Figure 3.

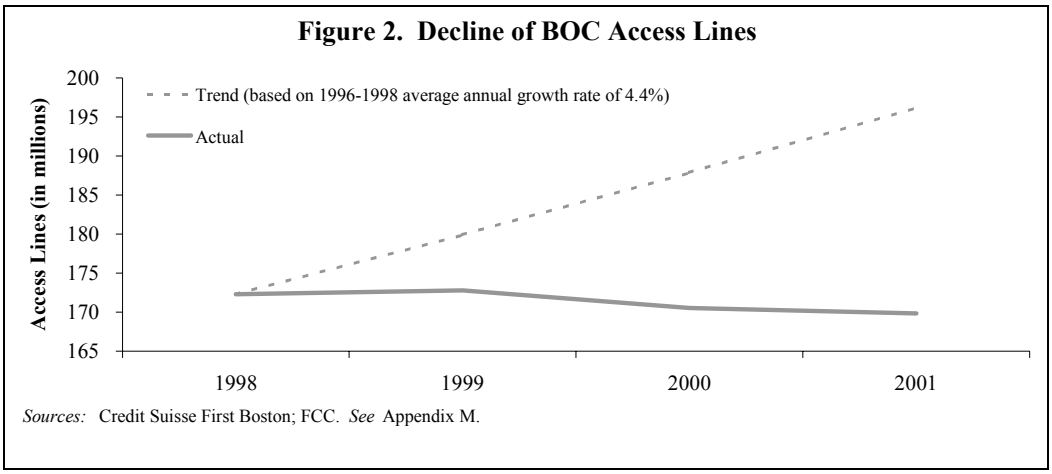
Table 3. Competitive Lines/Subscribers

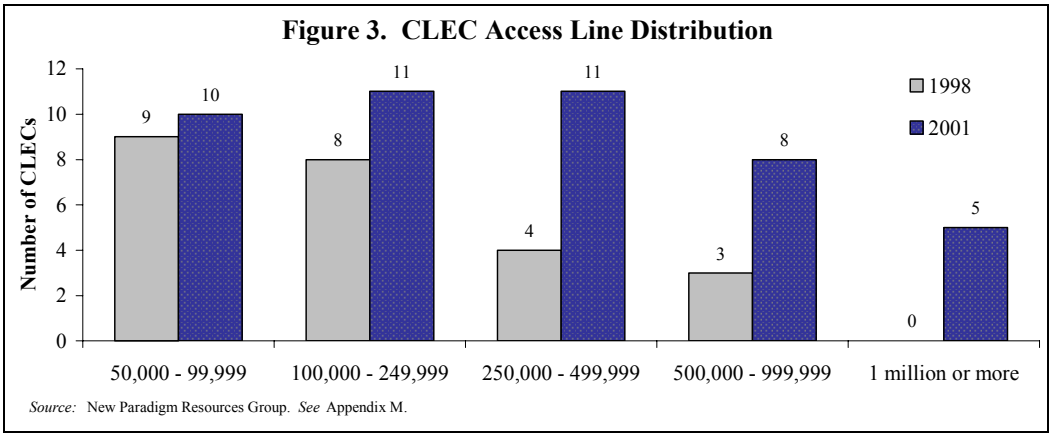
		YE 1998	YE 2001
Wireline CLECs	Facilities-Based Business Lines	5-6 million	13-20 million
	Facilities-Based Residential Lines	>80,000	3 million
	Resale/UNE-P Business Lines	1.2 million	3.8 million
	Resale/UNE-P Residential Lines	1.5 million	5.6 million
Wireless	Wireless Subs.	69 million	130 million
	Wireless Data Subs.	n/a	6.7 million
Broadband	Cable Modem Subs.	<300,000	7.5 million
	Fixed Wireless/Satellite Subs.	0	>200,000

Sources: See Appendix M.

[7] *See* Section II.A.

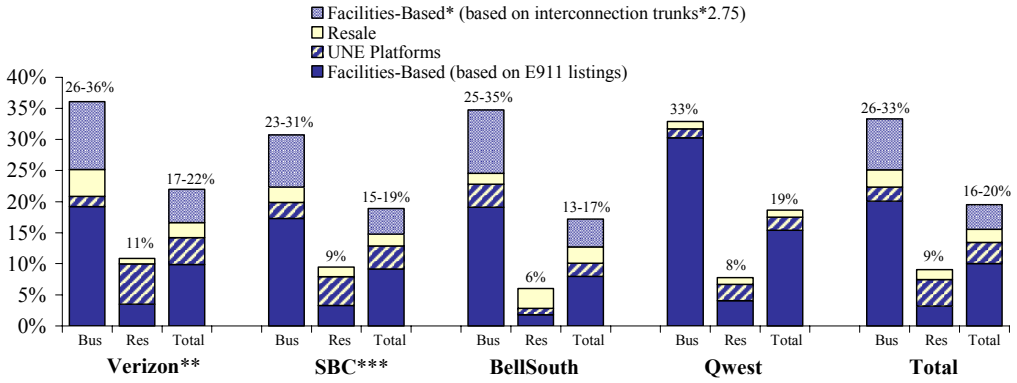
[8] *See* Sections II.A & IV.A; *see also* Table 4, *infra*, and Appendix A.





The CLECs' share of access lines in BOC regions is at least 16 percent, and likely closer to 20 percent. *See* Figure 4. Their share of BOC residential lines is approximately 9 percent, and their share of BOC business lines is at least 26 percent, and likely closer to 33 percent. In some BOC regions, the CLECs' share of lines is even higher. And, as noted above, at least two-thirds of all CLEC lines are provided wholly or partially over facilities they have deployed themselves.

Figure 4. Percentage of Total Access Lines Served by CLECs in BOC Regions



*The totals for facilities-based lines based on interconnection trunks multiplied by 2.75 represents the additional lines produced by this methodology over the number of E911 listings that CLECs have obtained.
**Verizon data do not include CLEC or ILEC lines in the former GTE service area.
***SBC data do not include CLEC or ILEC lines in Connecticut and Nevada.

Even at their lower end, the totals for facilities-based lines that we report here are considerably higher than the totals that CLECs themselves have reported to the FCC for incorporation into the FCC's February 2002 *Local Telephone Competition Report*. As discussed in Appendix A, however, our low-end totals have been obtained from CLEC-supplied listings in the E911 databases. For obvious reasons, these databases are highly reliable; ILECs and CLECs alike have the strongest possible incentives to maintain them accurately. In filing their line-total reports with the FCC, by contrast, many CLECs do not appear to be following the Commission's express instructions relating to the conversion of high-capacity lines into "voice-grade equivalent lines."[9] In contrast, the CLECs *do* make a distinction between lines and "voice-grade equivalents" in the reports they make to investors and securities regulators. *See* Table 4. The Commission indicates that CLECs *collectively* report serving a total of only 8.6 million lines wholly or partially over their own facilities. Yet AT&T alone has informed the investment community that the company serves "over 30 million" voice-grade equivalent lines over its own network. And 11 other CLECs that report their voice grade equivalent lines to investors have reported serving an additional 125 million voice-grade equivalent lines.

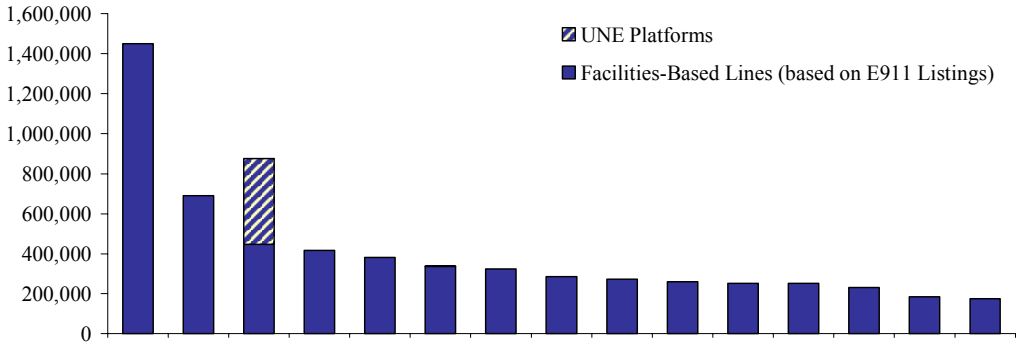
[9] The FCC's instructions specify that carriers are to report "voice-grade *equivalent* lines," which it defines as "a line or channel that directly connects an end user to a carrier and allows the end user to originate and terminate local telephone calls on the public switched network." FCC, *Instructions for the Local Competition and Broadband Reporting Form*, FCC Form 477 at 5-6 (data as of Dec. 31, 2001) (emphasis in original).

Table 4. CLEC Reporting of Voice-Grade Equivalent Lines to Investors		
	CLEC-Reported Totals	
WorldCom	76.4 million	"as of December 31, 2000, our domestic local voice grade equivalents had increased 98% to 65.5 million versus the prior year amount." "Voice Grade Equivalents 2001: **76,415,566**" – WorldCom, Inc., Form 10-K (SEC filed Mar. 13, 2002)
AT&T	>30 million	"Over **30 [million]** DS0 equivalents." – D. Dorman, President, AT&T, *Presentation Before the Lehman Brothers T3 Telecom, Trends & Technology Conference* (Dec. 6, 2001)
XO	21.2 million	"Voice Grade Equivalents (VGE, 64 Kbps capacity), a measure used by XO to evaluate the utilization of its network, grew to **21.2 million** in the fourth quarter of 2001." – XO Comm. Press Release, XO Communications Reports 74 Percent Increase in Annual Revenues and Reduced EBITDA Losses (Feb. 14, 2002)
Time Warner Telecom	16.7 million	"DS-0 Equivalents: **16,736,000**" as of YE01 – Time Warner Telecom Press Release, *Time Warner Telecom Announces Fourth Quarter Results* (Feb. 5, 2002)
Adelphia Bus. Solutions	4.6 million	"Voice Grade Equivalent Circuits: **4,624,032**" – Adelphia Business Solutions, Form 10-Q (SEC filed Nov. 13, 2001)
KMC Telecom	3.6 million	"Total lines (DS-0 equivalents – the combination of access lines and dedicated lines) grew to over **3.6 million** at the end of the third quarter 2001." – KMC Telecom Press Release, *KMC Telecom Reports Financial and Operational Results for the Third Quarter 2001* (Nov. 8, 2001)
Cox	1.8 million	"Voice Grade Equivalent Circuits: **1,773,340**" as of YE01." – Financial Data *attached to* Cox Press Release, *Cox Communications Announces Fourth Quarter Financial Results for 2001* (Feb. 12, 2002)
CTC	589,000	"Access Line Equivalents in Service at **589,000**" as of YE 2001 – CTC Communication Press Release, *CTC Communications Group Announces Fourth Quarter and Year End Results, Restructured Lease Financing Agreement and Amended Bank Facility* (Mar. 7, 2002)
CoreComm/ ATX	495,000	"Toll-related access line equivalents: **495,300**" as of 3Q01 – CoreComm Press Release, *CoreComm Limited Announces Financial Results for the Third Quarter of 2001* (Nov. 14, 2001)
Pac-West	235,000	"Total DS0 equivalent lines in service, which include wholesale and on-network retail DS0 line equivalents, were **235,244** in the fourth quarter of 2001." – Pac-West Press Release, *Pac-West Telecom Announces Fourth Quarter and Year-End 2001 Results* (Feb. 12, 2002)
PaeTec	233,000	"PaeTec . . . has installed **232,848** access line equivalents." – PaeTec Press Release, *PaeTec Exceeds 232,000 Access Lines* (Feb. 5, 2002)
Integra	>120,000	"more than **120,000** ALEs" [access line equivalents] as of YE01 – Integra Press Release, *Integra Telecom Reports Strong 2001 Growth* (Feb. 4, 2002)
Total	**156 million**	

As the totals for facilities-based competition make clear, CLECs have achieved significant economies of scope and scale, and have done so largely without relying on UNEs. More than half of all competitive lines are served entirely over CLECs' own facilities, and nearly two-thirds of competitive lines are served by CLECs' own switches. *See* Figure 1, *supra*. Moreover, these totals demonstrate that CLECs have chosen initially to focus on the most lucrative customer segments, and have therefore made much larger inroads than their count of lines would suggest. Indeed, as discussed below, the CLECs' share of revenues is considerably higher than their share of lines.

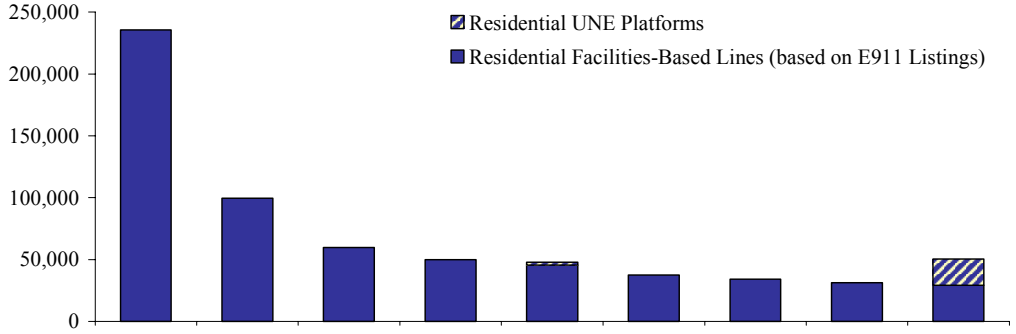
To the extent that CLECs continue to rely on the UNE Platform, market experience demonstrates that they are not migrating UNE-Platform customers to their own facilities to any significant degree (if at all) – despite the fact that they have already deployed the switches they need to do so, and have already built up very large customer bases. *See* Figures 5 & 6.[10] Indeed, many CLECs that have obtained UNE Platforms concede that they have no plans to convert these customers to their own switches. Contrary to the intent of the Commission's unbundling rules, these CLECs are treating UNE-Platform competition as an end in itself, rather than as a stepping stone to facilities-based competition. And in doing so, they are devaluing the efforts of CLECs that have decided to make the investment in facilities-based competition.[11]

Figure 5. Use of UNE Platforms by Top 15 Switch-Based CLECs Other Than AT&T and WorldCom



Top 15 CLECs represented include: Allegiance Telecom, Cablevision Lightpath, Choice One, Cox, Electric Lightwave, Focal Communications, ICG, Intermedia, McLeodUSA, Mpower, Net2000, RCN, Sprint, WinStar, and XO.

Figure 6. Use of UNE Platforms by CLECs Providing Service to 25,000 or More Residential Lines Using Their Own Switches*



*Excludes CLECs providing service over cable facilities. Does not include CLECs in Qwest's region.

CLECs providing service to 25,000 or more facilities-based residential lines include: ALLTEL, Broadview, Cavalier Telephone, Intermedia, Knology, McLeodUSA, RCN, TDS, and TOTALink.

[10] *See* Sections II.A & V.B.

[11] *See* Section V.B.

ILECs are also rapidly losing lines due to competition from wireless and cable providers.[12] Wireless phones compete directly for second lines, and to a lesser (but growing) extent for primary lines. Analysts estimate that about 10 million total access lines were replaced by wireless lines as of year-end 2001. Approximately 70 percent of all residential broadband subscriber lines are provided over cable networks, and two out of every three new broadband subscribers choose cable modem service.

Finally, a great deal more traffic is migrating off of ILEC networks than the migration of lines would indicate.[13] E-mail and instant messaging (IM) now substitute for a large fraction of voice traffic. There are now 900 million e-mail accounts in the U.S. and over 60 million IM users. It is estimated that consumers in the U.S. are sending approximately 3.2 billion e-mail messages and approximately 1 billion IM messages *per day*. If only 10 percent of the 4.2 billion daily e-mail and instant messages substitute for a voice call, that is equivalent to about 750 billion minutes per year, or roughly one-third of all voice traffic that passes through ILEC networks. A large and growing fraction of e-mail and IM traffic originates and/or terminates on competitive networks. And even when carried over ILEC networks, such traffic displaces significant usage-sensitive (*e.g.*, per-minute or per-call) revenues that otherwise would be earned.

C. Capital Investment.

CLECs, wireless carriers, and broadband providers have made enormous capital expenditures to expand the availability of their services.

CLECs have invested about $50 billion in new capital expenditures since the time of the last UNE review three years ago.[14] Significant venture capital has gone into the telecommunications industry.[15] CLECs also have raised large sums from strategic and institutional investors,[16] and have obtained significant additional funding from debt markets.[17]

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[12] *See* Sections II.B & IV.B.

[13] *See* Sections II.B & II.C.

[14] *See* ALTS, *The State of Local Competition 2001* at 20 (Feb. 2001) (citing Paine Webber and NPRG).

[15] In the four full years preceding the *UNE Remand Order*, the telecommunications industry had attracted only $5 billion in venture capital dollars. In 1999 alone, the telecommunications industry raised nearly $8 billion, and in 2000 the industry raised an additional $18 billion. Telecommunications continued to attract significant additional venture capital in 2001, raising nearly $6 billion in venture capital funding. *See* PricewaterhouseCoopers, *PricewaterhouseCoopers/Venture Economics/National Venture Capital Association MoneyTree Survey, Investments by Industry 1995-2001*, http://www.pwcmoneytree.com/PDFS/National%20Aggregate%20Data%2095Q1%20-%2001Q4.xls.

[16] CLECs raised more than $7.4 billion from strategic and institutional investors in 1999, plus another $3 billion in 2000 and 2001. *See* ALTS, *The State of Local Competition 2001* at 17-18 (Feb. 2001) (1999); W.T. Scott, *et al*., Morgan Stanley, *A Brief Critique – CLEC Events of the Week* at 12 (Dec. 12, 2001) (2000/2001); XO Press Release, *XO Announced $800 Million Equity Investment from Forstmann Little and Telmex* (Nov. 29, 2001); XO Press Release, *XO Reaches Definitive Agreement with Forstmann Little and Telmex* (Jan. 16, 2002). In addition to these totals, Bill Gates's private investment groups have invested $500 million in Cox. *See* Reuters, *Gates Invests $500 Million in Cox*, CNET News.com (Jan. 24, 2002), http://news.com.com/2100-1001-822792.html.

[17] According to one source, CLECs obtained $36 billion in loans in 1999. *See NPRG CLEC Report 2002, 15th ed.*, Ch. 2 at 6.

Initial public offerings by CLECs raised $2.6 billion in 1999 and 2000.[18] CLEC market capitalization has dropped sharply in the past 18-24 months, as it has in most other high-tech sectors. But many CLECs took advantage of the stock bubble, while it lasted, to finance acquisitions, investments, and capital outlays. *See* Table 5. More recently, stronger CLECs have taken advantage of falling stock prices to purchase their weaker siblings at a bargain price.[19]

Much of this competitive investment has gone into building urban fiber networks to serve business customers. But CLECs also have invested a great deal in building out their networks to serve residential customers. Cable operators have already invested at least $8 billion to upgrade their networks to provide telephony services.[20]

Cable operators and other competitive providers also have invested heavily to provide broadband services. The National Cable & Telecommunications Association (NCTA) estimates that the cable industry has invested more than $55 billion "to provide consumers advanced broadband services" since passage of the 1996 Act.[21] Satellite and fixed wireless providers also have made very large investments to provide two-way broadband services.[22]

There has been even more investment in terrestrial wireless facilities. Cumulative capital investment in the wireless industry has jumped from $24 billion at the end of 1995 to $100 billion as of June 2001.[23] Wireless carriers spent more than $18 billion in 2000 alone on network upgrades and expansion.[24] The cumulative capital investment in the wireless network ($100B) is now roughly one-quarter of the cumulative (depreciated) capital investment in the wireline network ($360B).[25] Annual capital spending on the wireless network ($18B) is running at about half of the corresponding figure for the wireline network ($40B), and continues to grow more

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[18] ALTS, *The State of Local Competition 2000* at Graphic D (Feb. 2000); IPO Home, *2000 Year in Review – All 2000 IPOs*, http://www.ipohome.com/marketwatch/review/iporeview.asp?stats=priced.

[19] For example, Time Warner Telecom acquired GST's assets; AT&T acquired NorthPoint's assets; and WorldCom acquired Rhythms's assets. *See* Time Warner Telecom Press Release, *Time Warner Telecom Finalizes Purchase of GST Assets* (Jan. 10, 2001); AT&T News Release, *AT&T Completes Acquisition of NorthPoint Communications* (May 25, 2001); WorldCom Press Release, *WorldCom Closes Rhythms Transaction* (Dec. 5, 2001).

[20] *See*, *e.g.*, *JP Morgan Cable Industry Report* at 46 & Table 22 (the cost of upgrading a home for circuit-switched cable telephony is $825/line, and there are 10.255 million homes passed by circuit-switched cable telephony).

[21] Letter from Robert Sachs, President & CEO, NCTA, to the Honorable Member of Congress (Feb. 8, 2002).

[22] *See*, *e.g.*, *Application of EchoStar Communications Corporation, General Motors Corporation, Hughes Electronics Corporation, Transferors, and EchoStar Communications Corporation, Transferee, For Authority to Transfer Control,* Consolidated Application for Authority to Transfer Control at 46, CS Docket No. 01-348 (FCC filed Dec. 3, 2001) ("Each of ECC (EchoStar Communications Corporation) and Hughes has already made significant broadband investments and plans future deployment of additional high speed Internet access.").

[23] *See CTIA's Semi-Annual Wireless Industry Survey Results*.

[24] *See* CTIA, *Telephia Study Finds Outstanding Wireless Network Performance While Industry Experiences Rapid Growth*, http://www.wow-com.com/articles.cfm?ID=553.

[25] *CTIA's Semi-Annual Wireless Industry Survey Results*; *FCC Statistics of Common Carriers* at Table 2.7 (1995-2001 eds.).

rapidly (averaging 35 percent growth each year for the last five years, while wireline investment has grown at an average of 14 percent each year).[26]

Table 5. CLEC Mergers & Acquisition Activity			
Acquirer	**Target**	**Firm Value**	**Date Closed**
NEXTLINK	Concentric Network	$2.2 billion	June 2000
McLeodUSA	SplitRock Services	$1.8 billion	April 2000
CoreComm	ATX	$900 million	September 2000
Advanced Radio Telecom	Broadstream	$365 million	August 2000
Mpower	Primary Network	$145 million	June 2000
Choice One	US XChange	$515 million	August 2000
Covad	BlueStar	$202 million	September 2000
Gabriel	TriVergent		November 2000
Time Warner Telecom	GST	$690 million	January 2001
WorldCom	Intermedia	$5.5 billion	July 2001
McLeodUSA	CapRock	$532 million	December 2000
Hughes Electronics	Telocity	$180 million	April 2001
AT&T	NorthPoint assets	$135 million	May 2001
Allegiance	Coast-to-Coast Communications	$27 million	September 2001
Cavalier Telephone	Conectiv Communications	n/a	November 2001
WorldCom	Rhythms NetConnections	$31 million	December 2001
IDT Corp.	WinStar	$42.5 million	December 2001
Choice One	Fairpoint (comm. assets only)	undisclosed	December 2001
Comcast	AT&T Broadband	$72 billion	announced Dec. 2001
Allegiance	Intermedia Business Internet assets acquired from WorldCom	undisclosed	January 2002
Cavalier Telephone	Net2000 (VA, MD, DC)	$25 million	January 2002
Broadview Networks	Net2000 assets (NY/MA/NJ) acquired from Cavalier	undisclosed	January 2002
New Edge Networks	@Work	$1.5 million	February 2002
Cogent	Allied Riser	n/a	February 2002
Broadview Networks	Network Plus	undisclosed	announced Feb. 2002
Sources: See Appendix M.			

D. Revenues.

Though precise figures of CLEC local revenues are elusive,[27] facilities-based CLECs are now generating substantial revenues. According to New Paradigm Resources Group's *CLEC*

[26] *Compare FCC Statistics of Common Carriers* at Table 2.7 (1995-2001 eds.) *with CTIA's Semi-Annual Wireless Industry Survey Results*.

[27] Many CLECs are not public companies and do not therefore report their revenues to the Securities Exchange Commission. While most CLECs do report revenues to the FCC, the FCC releases this data in only aggregate form. Complicating matters, the revenue categories reported by the FCC have fairly amorphous parameters. For example, it is difficult to distinguish revenues generated from exchange access services from those generated from intraLATA toll and special access services. This is particularly true with respect to those revenues generated by

Report – a source relied on by the CLEC industry[28] – total CLEC revenues (excluding long distance revenues) increased five-fold between year-end 1998 ($8.5B) and year-end 2001 ($44B). *See* Figure 7.[29] New Paradigm estimates that CLEC revenues from switched local services increased from $3.5 billion in 1998 to $9.5 billion in 2001.[30] The latest revenue data compiled by the FCC show CLECs with a total of $8.5 billion in local revenues as of year-end 2000.[31] Since the time of the last UNE review, the number of CLECs earning $100 million or more has nearly doubled. *See* Figure 8.

CLECs specifically target customers that generate high levels of traffic and revenues[32] – analysts and the FCC report that the CLECs' share of revenues is between 12 and 20 percent higher than their share of lines.[33] And the CLECs' share of high-end local services is considerably higher than their share of local revenues overall. For example, the CLECs' share of special access revenues is between 28 and 39 percent.[34] The big three interexchange carriers control more than two-thirds of the revenues for ATM and Frame Relay services.[35]

CLECs that provide local services also earn significant revenues from the provision of other telecommunications services. According to New Paradigm, CLECs now earn nearly $25 billion from the provision of data and data-related services such as Internet access, frame relay,

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carriers that are both CLECs and interexchange carriers, including AT&T and WorldCom – the largest carriers in both categories – who report their revenues as both kinds of entities. *See* Appendix L.

[28] *See*, *e.g.*, ALTS, *The State of Local Competition 2001* (Feb. 2001); ALTS, *An ALTS Analysis: Local Competition Policy & The New Economy* (Feb. 2, 2001); ALTS, *The State of Competition in the U.S. Local Telecommunications Marketplace* (Feb. 2000).

[29] *See NPRG CLEC Report 2000, 12th ed.*, Ch. 1 at Table 3; *NPRG CLEC Report 2002, 15th ed.*, Ch. 3 at Table 9. "Other" revenues reported by New Paradigm (*i.e.*, reciprocal compensation and non-telecom related revenues) are excluded from these totals. Credit Suisse First Boston estimates that total CLEC revenues (excluding long-distance and data revenues) have grown from approximately $5 billion in 1998 to approximately $12.5 billion in 2001. *See CSFB 4Q00 CLEC Vital Signs Review* at Table 11 (4Q1998); *CSFB 3Q01 CLEC Vital Signs Review* at Exh. 9 (1Q 2001-3Q 2001 results; 4Q 2001 estimate).

[30] *Compare NPRG CLEC Report 2000, 12th ed.*, Ch. 1 at Table 3 *with NPRG CLEC Report 2002*, *15th ed.*, Ch. 2 at Table 8. Credit Suisse First Boston estimates that CLEC revenues from switched local services has increased from approximately $3.7 billion in 1998 to $10.8 billion in 2001. *See CSFB 4Q00 CLEC Vital Signs Review* at Table 11 (4Q1998); *CSFB 3Q01 CLEC Vital Signs Review* at Exh. 9 (1Q 2001-3Q 2001 results; 4Q 2001 estimate).

[31] *FCC Telecommunications Industry Revenues, 2002 ed.* at Table 7; *NPRG CLEC Report 2002, 15th ed.*, Ch. 2 at Table 8.

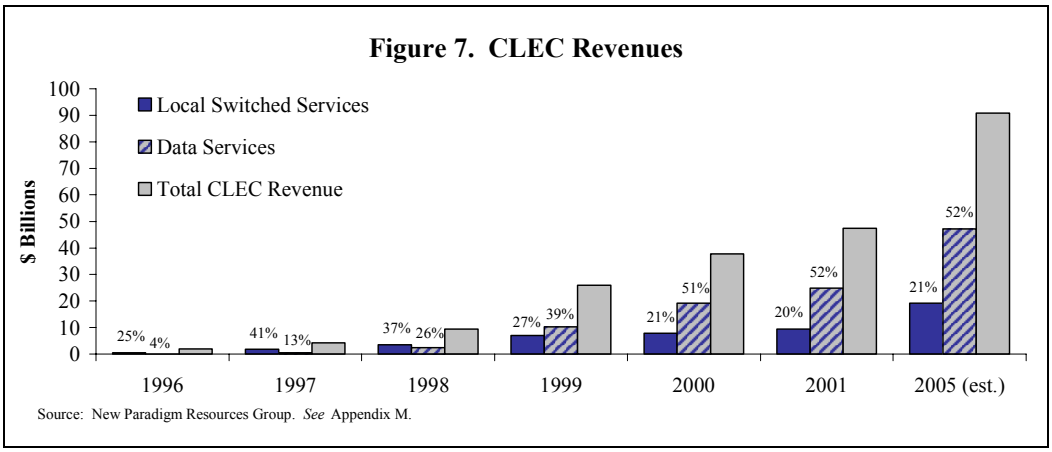
[32] *See*, *e.g.*, Legg Mason, *Telephone Wars: Local Competition Update* at 2 (May 22, 2001) ("The CLEC sales figures reflect larger market share gains than those calculated on the basis of line lost, since the majority of lines lost are of the high-usage commercial type.").

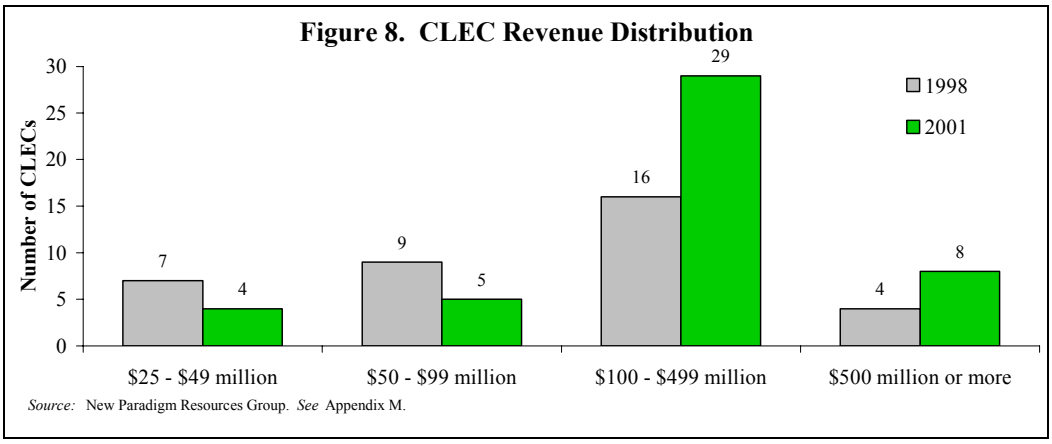
[33] *See*, *e.g., id.* at 3 (At the end of 1Q01 "the CLEC share of the total US line market was 7.6%," while "the CLEC's share of the gross industry revenues was approximately 9.2%," a difference of 21%.); *FCC Local Competition Report, Feb. 2002 ed.* at 4, Table 1 ("The share of local service revenues claimed by carriers competing with the ILECs" was 8.9% in 2000 while CLECs reported a 7.7% share of end-user switched access lines in December 2000, a difference of 15.6%); *CSFB 3Q01 CLEC Vital Signs Review* at Exh. 9 (Through 3Q01, local competitors' share of U.S. access lines was 9.7%, while local competitors' share of the local market revenues at quarter end was 10.9%, a difference of 12.4%).

[34] *See* Section V.C & Appendix L.

[35] *See* Section II.B, Figure 5.

ATM, DSL, "and other enhanced data and Web-related services."[36] CLECs other than the big interexchange carriers earn an additional $3 billion from the provision of long distance services.[37] Cable telephony providers are able to bundle video and data services with the voice services they provide, and analysts expect "video/voice" to be the "most popular" bundle of service desired by consumers.[38]





If cable companies are counted among them, CLECs earn substantial revenues in the local, high-speed data transport sector as well. Cable companies earned an estimated $2.3 billion from the provision of high-speed data services in 2001, and that figure is projected to exceed $10 billion by 2006.[39]

Wireless carriers also are competing directly with ILECs for a large and increasing share of revenues. As of year-end 2000, wireless carriers reported $62 billion in revenues, which

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[36] *NPRG CLEC Report 2002, 15th ed.*, Ch. 3 at 3.

[37] *See id.*; *see also FCC Trends in Telephone Service, Aug. 2001 ed.* at Table 10.1 ($1.3 billion in toll revenues earned by CAPs and CLECs as of year-end 2000).

[38] *JP Morgan Cable Industry Report* at 42.

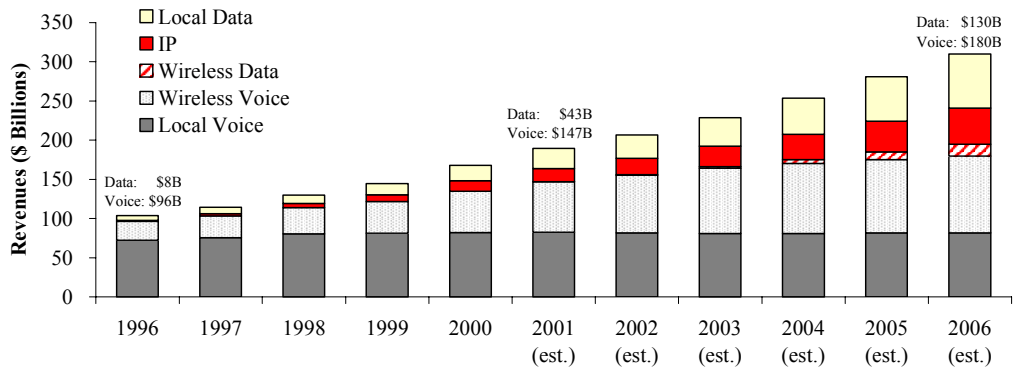
[39] *See* R.A. Bilotti, *et al.*, Morgan Stanley, Dean Witter, *Broadband Cable Television* at 9 (July 3, 2001).

represents more than half of the revenues that wireline carriers reported for local service.[40] At the time of the last UNE review, wireless revenues were at $37 billion, about one-third the amount of wireline local revenues.[41]

E. Outlook.

As a percentage of the overall telecommunications market, wireline local voice is rapidly declining, as local traffic moves on to wireless and data networks, and the volumes of data traffic continue to surge. *See* Figure 9. Wireline local voice revenues grew by an average of 2.7 percent per year between 1996 and 2001, but are expected to remain constant over the next five years.[42] While wireline local voice revenues represented approximately 44 percent of all local revenues in 2001, they are expected to represent only 26 percent by 2006.[43]

Figure 9. Wireless and Data Overtaking Voice



Source: JP Morgan H&Q. *See* Appendix M.

Cable telephony providers are expected to "have more than 10 million circuit-switched telephony customers in 2006."[44] Cable operators will have deployed IP-telephony widely by that time as well, and are expected to serve nearly five million telephony customers over packet-switched networks.[45]

Data traffic has already overtaken voice traffic on the telephone network, and data traffic is growing much faster than voice. Most access-line growth between 1996 and 2000 was due to data, with customers adding second lines as a dedicated Internet/fax line.[46] These lines are now

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[40] *See FCC Telecommunications Industry Report, 2002 ed.* at Table 1.

[41] *See CTIA's Semi-Annual Wireless Industry Survey Results*.

[42] *See JP Morgan Telecom Services 2001 Report* at Table 1.

[43] *See JP Morgan Telecom Services 2001 Report* at Table 1.

[44] *Forrester Sizing US Consumer Telecom Report* at 10.

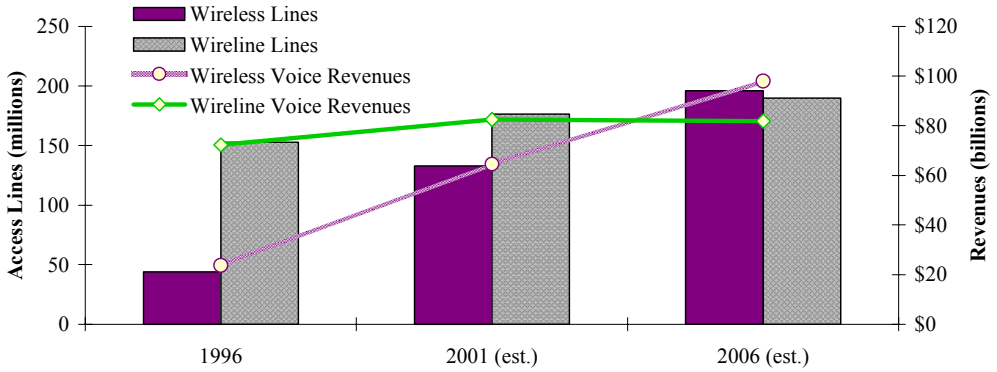
[45] *See Forrester Sizing US Consumer Telecom Report* at 10-12.

[46] *See, e.g., Gartner U.S. Residential Wireline Report* at 5 ("additional line growth rates have been significantly higher among online households than their offline counterparts.").

in rapid decline, with most customers opting for a wireless or cable connection instead of a second line.[47] By 2006, it is expected that 17 million circuit-switched lines will have been superceded (*i.e.*, rendered technologically obsolete) by wireless, cable modem, and non-DSL packet-switched connections.[48] Local data revenues are expected to grow to nearly $70 billion in the next five years.[49] By that time, data is expected to make up 46 percent of all local revenues, up from 24 percent today. *See* Figure 9. A great deal of data traffic is carried on non-ILEC networks. Cable modem is adding residential broadband subscribers much faster than DSL, and cable is expected to maintain a two-to-one lead over DSL five years from now.[50]

Wireless carriers are adding subscribers much faster than their wireline counterparts – in percentage terms, and in absolute terms, too. Some twenty million new subscribers are being added annually.[51] IDC estimates that, by 2005, wireless "lines" will have cumulatively displaced a total of approximately 20 million wirelines (counting both primary and secondary access lines).[52] Wireless minutes of use are growing at over 60 percent per year, while landline minutes are growing at "low single digits."[53] By 2003, wireless voice revenues are expected to surpass wireline voice revenues. *See* Figure 10.

Figure 10. Wireless vs. Wireline Growth



Source: JP Morgan H&Q. *See* Appendix M.

[47] *See*, *e.g.*, *id.* at 7-9 (finding that, from January to June 2001, 6 million households (6 percent of all households) have replaced a traditional telephone access line with another form of communications line, and 61.5 percent of those 6 million have chosen wireless or cable); *see also* Sections II.C & IV.B.

[48] *See Forrester Sizing US Consumer Telecom Report* at Figures 6 & 8-1.

[49] *JP Morgan Telecom Services 2001 Report* at 25.

[50] *See*, *e.g.*, *JP Morgan Telecom Services 2001 Report* at Table 16 (Nov. 2, 2001) (showing 25.9 million residential cable modem subscribers and 12.9 million residential DSL subscribers in 2006.); *see also Morgan Stanley Cable Modem/xDSL Report* at Exh. 1; Section IV.C.

[51] *See CTIA's Semi-Annual Wireless Industry Survey Results*.

[52] *See IDC Wireless Displacement Report* at Figure 23; *see also Forrester Sizing US Consumer Telecom Report* ("Over the next five years, the mobile business will take a cut at fixed-line revenues. Wireless operators will ravage the fixed-line business as 5.5 million consumers give up secondary lines, and an additional 2.3 million cut the cord on their primary line.").

[53] *3g Rollouts Inch Along, But Kagan Research Indicates Wireless Minutes Roaring Ahead, Set to Dominate Telecom Landscape by 2005 Leading Executives to Debate Market Demand, Technology and Financing at Kagan's Wireless Telecom Summit May 2-3 in New York*, Bus. Wire (Apr. 27, 2001); *see* Section II.C.

Next-generation broadband technologies are now being deployed.[54] Much of the copper distribution plant will have to be replaced with fiber in order to support the growing demand for broadband services. Wireless broadband services – both fixed and mobile – are coming, too. Analysts predict that 3G mobile networks will be widely deployed by 2004 or 2005. The Commission also has recently taken the first steps to "pave the way for new types of products incorporating ultra-wideband (UWB) technology" – devices that may be able to operate on spectrum already occupied by existing radio services without causing interference. It has also resolved to explore the introduction of "software defined radio" (SDR) technology, which could allow a single device to be quickly reprogrammed to transmit and receive on any frequency within a wide range using virtually any transmission format. There also are a host of other technologies currently under development that will be capable of provisioning wireless broadband services. These include Digital SMR, third generation mobile systems, 2 GHz MSS satellite systems, L-Band satellites, and Big LEO satellites. Recent advancements in fixed wireless technologies – particularly Non-Line-of-Sight technologies – are expected to "cause a spur in service provider deployments."

Entirely new telecommunications networks are being deployed to satisfy surging demand for high-speed packet-switched data services. Much of this new infrastructure has little relation to the old. Fiber is replacing copper in the loop; packet switches are replacing circuit switches in the central office; and the transport between these packet switches is using very different routes than the rigid point-to-point connections between central offices that have prevailed in the past. In deploying this new infrastructure, ILECs will enjoy no particular advantages over competing carriers.

Most of the broadband market that is now emerging remains up for grabs. Most of the technology that will ultimately be used to provide ubiquitous broadband service has not yet been developed. Most of the capital has not yet been committed. Most of the customers are not yet being served. And because broadband digital services will ultimately absorb and displace the old, analog voice and video, no established player in telecom, cable, or broadcast markets today has any assurance of winning any durable share of the vast digital market ahead.

[54] *See* Section V.D.

II. LOCAL SWITCHING

At the time of the FCC's last UNE review, CLECs had deployed approximately 700 local circuit switches.[1] Today, CLECs operate approximately 1,300 *known* local circuit switches. *See* Appendix B.[2] At the time of the last UNE review, CLECs were serving about six million lines using switches they had deployed.[3] As of year-end 2001, CLECs were serving no fewer than *16 million* local lines, and likely closer to *23 million* local lines – including approximately three million *residential* lines – over their own switches. CLEC switches are now so geographically widespread that they are being used to serve local customers in wire centers that contain approximately *86 percent* of the Bell companies' access lines. In the 100 largest Metropolitan Statistical Areas (MSAs), CLECs are using their switches to serve local customers in wire centers that contain approximately *96 percent* of the BOC access lines in those MSAs. *See* Appendix C. All of these figures are conservative, because they are drawn from public sources or from the necessarily limited data available to the BOCs.

More than 200 CLECs of all sizes have actually deployed local circuit switches in the Bell companies' regions. While the two largest CLECs (AT&T and WorldCom) account for more than 25 percent of these switches, the next 15 largest CLECs (measured by switch ownership) account for an additional 37 percent of all local circuit switches. *See* Figure 1. The number of CLECs operating 10 or more circuit switches has increased from 15 to 27 since the time of the last UNE review, while the number operating 20 or more has increased from 6 to 16.[4] And with the exception of AT&T and WorldCom, the 15 largest switch-based CLECs (measured by switched-based lines served) make virtually no use of unbundled switching, either on a stand-alone basis or as part of the so-called UNE-Platform. *See* Figure 2.

Cable companies have deployed large number of circuit switches that they are using, in combination with their own loops, to provide cable telephony service that bypasses ILEC networks completely. This service is now available to more than 10 percent of all U.S. homes and there are more than 1.5 million actual subscribers. Cable telephony is now available statewide in some smaller states (like Cox service in Rhode Island) and to a large and growing fraction of homes in a number of larger states (*e.g.*, AT&T service in and around Pittsburgh, Boston, Chicago, and the Bay Area, and Cox service in San Diego, Orange County, and the Tidewater area of Virginia).

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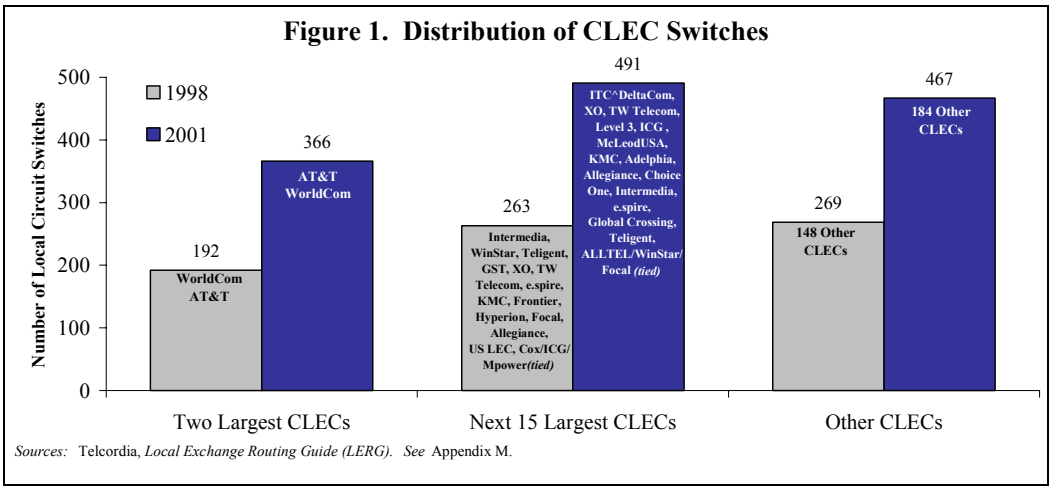
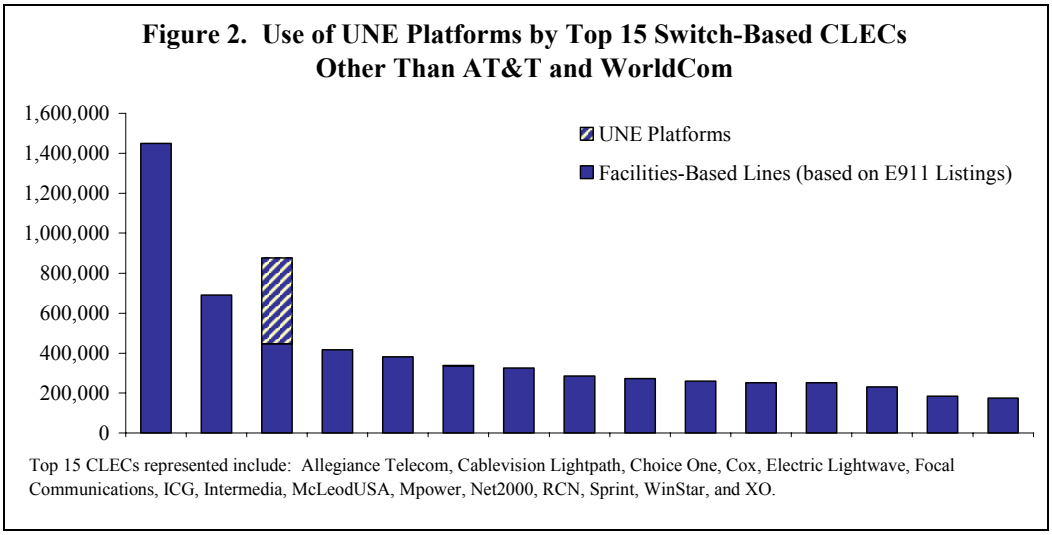
[1] *See UNE Remand Order* ¶ 254 ("As of March 1999, approximately 167 different competitors have deployed approximately 700 switches throughout the country.").

[2] *See* Telcordia, *January 2002 LERG*. New Paradigm Resources Group ("NPRG") reports that, as of year-end 2001, CLECs had deployed 1,244 circuit switches with another 92 circuit switches planned. *See NPRG CLEC Report 2002, 15th ed.*, Ch. 2 at 20. That figure is based on the circuit switches of 70 companies profiled by NPRG. *See id.* By comparison, the LERG database indicates that approximately 200 competing carriers have deployed circuit switches. *See* Appendix B.

[3] This figure is based on the number of interconnection trunks CLECs had obtained as of year-end 1998 (*see* Section I, Table 3), and assumes that for each trunk a CLEC had obtained as of that date, the CLEC was serving 2.75 lines. *See* Appendix A (describing this methodology in more detail).

[4] *See* Section V, Figure 1.





Packet and wireless switches are now placing significant, additional competitive pressure on ILECs' traditional circuit switches. At the time of the last UNE review, 36 million households still relied on dial-up connections – and thus on ILEC circuit switches – for their data services.[5] As discussed further in Section IV.C, however, nearly eight million users now have broadband cable or wireless data links instead, which bypass the circuit switch completely and terminate directly on a competitive packet switch. If all of these broadband users would otherwise be using dial-up connections, the packet switches used to provide these services now displace at least 4 percent of all circuit-switched minutes of use, even assuming that the average data line is used only as much as the average voice line. The total would be far higher if one takes into account the fact that data calls generally last much longer than voice calls. Since the last UNE review, the installed base of CLECs' *known* packet switches has jumped from 860 to more than 1,700.[6] *See* Appendix E.

[5] *See JP Morgan Cable Industry Report* at Table 13 (36.7 million online households in 1998 minus 700,000 broadband households equals 36 million dial-up households).

[6] *See NPRG CLEC Report 2000, 12th ed.*, Ch. 6 (1998 total); *NPRG CLEC Report 2002, 15th ed.*, Ch. 4 at

The dramatic rise of wireless services since the last UNE review is certainly having a similar impact on circuit-switched ILEC traffic. As of year-end 1998, there were about 69 million wireless subscribers; as of year-end 2001, there were an estimated 130 million, as compared to about 190 million wireline switched access lines.[7] Today, a large and rapidly growing number are using wireless service as a substitute for second and additional lines, and a growing number are abandoning their wireline phones altogether. There were approximately 200 billion billable minutes of wireless use in the first half of 2001, and by the end of 2001 wireless calls accounted for an estimated 12 percent of all U.S. phone calls. Many wireless carriers offer particularly attractive long-distance calling plans; when the wireless phone is used for long-distance calls, the ILEC loses traffic not only in end office switches but in access tandems, too. Wireless carriers not affiliated with the Bell companies have deployed at least 950 local switches. *See* Appendix F.

A large and growing fraction of business customers also locate switching equipment directly on their premises, which enables them to perform a portion of their local switching in-house, rather than outsource it to an ILEC's circuit switch. Today, there are approximately 56 million lines served through private branch exchanges (PBXs). A PBX performs all the local switching between the lines that connect to it directly. Moreover, a new generation of PBXs that use IP-based packet switching instead of circuit switching make PBXs economical for an even larger share of businesses.

Table 18 (2002 total). This is a highly conservative estimate. It does not include the 840 packet switches NPRG lists for competitive Independent Operating Companies, utility CLECs, data providers, or Gig-E providers. In addition, it does not include the 7,000 packet switches that NPRG lists for AT&T as of year-end 2001. According to NPRG's prior reports, AT&T had only 50 packet switches as of year-end 2000. Because one-year growth of this magnitude is unlikely, in an abundance of caution we have used the 2000 figure for AT&T's packet switches.

[7] *CTIA's Semi-Annual Wireless Industry Survey Results*; CTIA, *CTIA's World of Wireless Communications*, http://www.wow-com.com (131 million U.S. wireless subscribers as of Feb. 12, 2002); *CSFB 3Q01 CLEC Vital Signs Review* at Exh. 9 (189 million U.S. access lines as of 4Q2001).

Table 1. Competition for ILEC Circuit-Switched Local Traffic				
	Switches	**Subscribers/Lines**	**Minutes**	**Revenues**
CLEC Circuit Switches	1,300 CLEC circuit switches (plus 360 remote switches)	At least 16 million lines, and likely closer to 23 million lines served on CLEC switches	493 billion minutes originating/terminating on CLEC switches per year	$10 billion (CLECs switched local service revenues)
Wireless	950 non-BOC wireless switches	130 million wireless subscribers	500 billion minutes originating/terminating on wireless switches per year	$64 billion (wireless voice revenues)
Data	1,700 CLEC packet switches	8 million residential cable/wireless/satellite broadband subscribers	Six times more data traffic than voice Traffic over broadband connections exceeds traffic over narrowband	$2 billion cable modem revenue $6 billion CLEC/IXC ATM/Frame Relay revenue
PBX	n/a	56 million PBX lines	Intra-PBX switching on 44 percent of all business lines	n/a
Sources: See Appendix M.				

A. CLEC Circuit Switches.

By very conservative estimates, CLECs are serving no fewer than *16 million* local lines, and likely closer to *23 million* local lines – including approximately three million *residential* lines – over the local circuit switches they have deployed. *See* Table 2 & Appendix A. CLECs serve a far larger number of actual circuits using their switches, because many of the lines they serve are high-capacity lines.[8]

Table 2. Lines Served over CLEC Switches, YE 2001				
	Based on E911 listings			**Based on Interconnection Trunks***
	Business	**Residential**	**Total**	
Verizon**	3.7 million	1.0 million	4.7 million	7.8 million
SBC***	4.5 million	1.2 million	5.7 million	8.6 million
BellSouth	1.8 million	300,000	2.1 million	3.5 million
Qwest	2.9 million	500,000	3.4 million	2.5 million
Total	**13 million**	**3 million**	**16 million**	**23 million**
*Assumes a ratio of 2.75 lines per interconnection trunk. *See* Appendix A (providing basis for this methodology). ** Verizon E911 listings and interconnection trunk data do not include the former GTE service area. *** SBC E911 listings data do not include Connecticut.				

CLECs are using their switches to serve local customers in one of two ways. First, they are porting numbers from ILEC switches to their own switches using local number portability (LNP). Second, they are using NXX codes obtained from the North American Numbering Plan administrator.

[8] *See* Sections I.B, Table 4 & IV.A; *see also* Appendix A.

CLECs have ported approximately 14 million telephone numbers in the Bell companies' regions, virtually all of which have been ported since the time of the last UNE review.[9] In the last year alone, the number of CLEC ported numbers has grown by more than 70 percent. *See* Table 3. This demonstrates that CLECs have not only significantly increased their deployment of circuit switches, but also that they are now using these switches extensively to win local customers.

Table 3. Growth of Ported Numbers

	2000	2001	Growth
Verizon	2.7 million	4.7 million	77%
SBC*	3.0 million	5.1 million	73%
BellSouth	1.1 million	1.8 million	64%
Qwest	1.4 million	2.4 million	71%
Total	**8 million**	**14 million**	**73%**

Growth percentages may not equal the differences shown due to rounding. * SBC data do not include Connecticut.

1. Geographic Areas Served by CLEC Circuit Switches.

As the FCC has recognized, competition for switched services may be assessed by analyzing where CLECs have obtained ported numbers and NXX codes.[10]

The Bell companies maintain internal data of the wire centers in which CLECs have ported telephone numbers from the BOCs' switches to the CLECs' own switches.[11] Each number ported from a BOC's switch to a CLEC's switch represents a telephone served by that competitor's own switch. Each wire center in which a CLEC has obtained a ported number therefore represents a geographic area where a CLEC is actually competing for local customers today using switches that it has deployed itself.

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[9] *See Telephone Number Portability*, Third Memorandum Opinion and Order on Reconsideration, 13 FCC Rcd 16090, ¶ 2, n.7 (1998) (first requiring ILECs to implement LNP in the 100 largest MSAs by December 31, 1998).

[10] *See*, *e.g.*, *FCC Local Competition Report, Aug. 1999 ed.* at 2, 43, Tables 4.1-4.3 & 5.1 (summarizing NXX code assignment activity and supplying information on ported numbers which "should provide insights into the number of customer lines served by competitors"); *id.* at 43 (using an NXX-based analysis for identifying "new entrants in the switched market."); *id.* ("A local service competitor that owns a telephone switch must acquire a numbering code for that switch before commencing operation as a facilities-based CLEC providing mass market telephone service."); *UNE Remand Order* ¶ 254 (noting with approval SBC's evidence of competition for switching "using a methodology that tracks requesting carriers' switches by examining migration of lines using ported numbers."); *id.* ¶ 285 (relying on data of CLEC switches with NXX codes as basis for creating exception to national unbundled switching rule in Zone 1 wire centers).

[11] A wire center is "the location of a local switching facility containing one or more central offices." 47 C.F.R. § 54.5; *see id.* ("wire center boundaries define the area in which all customers served by a given wire center are located."); *see also Policy and Rules Concerning Rates for Dominant Carriers and Amendment of Part 61 of the Commission's Rules to Require Quality of Service Standards in Local Exchange Carrier Tariffs*, Memorandum Opinion and Order, 12 FCC Rcd 8115, ¶ 7, n.14 (1997) (A wire center "might have one or several class 5 central offices, also called public exchanges or simply switches.").

These ported number data demonstrate that CLECs are using their switches to serve local customers ubiquitously throughout the BOCs' regions.[12] As of year-end 2001, one or more CLECs had ported a telephone number to its own switch in 47 percent of BOC wire centers, which contain approximately *86 percent* of all BOC switched access lines, including approximately 89 percent of all *business* lines and approximately 84 percent of all *residential* lines. *See* Tables 4 & 5. Significant numbers of BOC access lines are in wire centers served by multiple CLEC switches. *See id.*

The totals are even higher in the largest metropolitan areas. In the 100 largest MSAs, one or more CLECs had ported a telephone number to its own switch in 83 percent of BOC wire centers in those MSAs, which contain approximately *97 percent* of all BOC switched access lines in those MSAs. *See* Appendix C.

Table 4. Percentage of Wire Centers Where CLECs Have Acquired Customers Through Ported Numbers

	Percentage of Wire Centers Served by:			
	1 or more CLEC switch	**2 or more**	**3 or more**	**4 or more**
Verizon	44	32	26	22
SBC	47	35	28	25
BellSouth	58	39	32	28
Qwest	43	32	26	23
Total	**47**	**34**	**28**	**24**

Table 5. Percentage of Access Lines in Wire Centers Where CLECs Have Acquired Customers Through Ported Numbers

	Percentage of BOC Switched Access Lines in Wire Centers Served by:											
	1 or more CLEC switch			**2 or more**			**3 or more**			**4 or more**		
	Bus.	**Res.**	**Tot.**	**Bus.**	**Res.**	**Tot.**	**Bus.**	**Res.**	**Tot.**	**Bus.**	**Res.**	**Tot.**
Verizon	90	83	85	84	75	79	80	69	73	75	64	68
SBC	88	83	85	82	75	77	74	66	69	70	62	65
BellSouth	94	90	91	85	79	80	79	71	74	73	65	67
Qwest	89	83	85	82	75	77	75	68	71	71	64	66
Total	**89**	**84**	**86**	**83**	**76**	**78**	**77**	**68**	**71**	**72**	**63**	**66**

[12] For purposes of this report we have included in the analysis switches owned by CLECs that have declared bankruptcy. Most such CLECs are still operational. Moreover, switches are a sunk investment, so if one company ceases to use its switch it is highly likely that another company will quickly seize the opportunity to do so (and will probably be able to obtain the switch at a fire-sale price). In addition, even though some CLECs may now be experiencing financial troubles, the fact that they were able to deploy so many switches at one time is still highly probative of the ability of CLECs to deploy switches generally. In any event, switches operated by CLECs that have declared bankruptcy (as of March 31, 2002) represent no more than 17 percent of the total counted for purposes of this report.

The areas that CLECs are capable of serving with their own switches also can be determined based on the NXX codes that CLECs have obtained. Each NXX code is associated with a "rate exchange area" served by an incumbent LEC.[13] The rate exchange areas where CLECs have obtained NXX codes are the areas where CLECs have determined they may use their own switches to compete directly with incumbent LECs.

Telcordia's *Local Exchange Routing Guide* (LERG) database contains the location of each CLEC switch, the NXX codes associated with those switches, and the rate exchange areas served by those NXX codes.[14] These data demonstrate that, as of year-end 2001, one or more CLECs had obtained an NXX code to serve approximately 47 percent of BOC rate exchange areas, and that significant numbers of rate exchange areas are served by multiple CLEC switches. *See* Table 6. In the 100 largest MSAs, one or more CLECs had obtained an NXX code to serve more than 85 percent of BOC rate exchange areas in those MSAs. *See* Appendix D.

Table 6. Rate Exchange Areas Where CLECs Have Obtained NXX Codes

	Percentage of Rate Exchange Areas Served by:			
	1 or more CLEC switch	**2 or more**	**3 or more**	**4 or more**
Verizon	43	26	20	16
SBC	46	25	14	8
BellSouth	64	41	29	19
Qwest	46	21	13	10
Total	**47**	**27**	**19**	**14**

The percentage of wire centers and rate exchange areas served by CLEC switches is a highly conservative measure of the extent to which CLECs actually serve – or have the ability to serve – customers using their own switches.

First, the data count only CLECs switches actually up and running, and only the locations that are presently served by these switches. CLECs could readily extend the geographic reach of existing switches, or deploy still more switches. As the Commission has found, whereas each ILEC switch typically serves only a single rate exchange area, CLECs can and do use their switches to serve multiple rate exchange areas.[15] As one CLEC explains, "[t]he advent of fiber

[13] Rate exchange areas are "geographically defined areas within which calls that originate and terminate (*i.e.*, remain within the area) are considered local calls." *FCC Local Competition Report, Dec. 1998 ed.* at 41, n.17.

[14] In the *Triennial Review Notice*, the FCC asked whether the LERG database "is a reliable indication of whether competitors can serve the mass market using their own switches." *Triennial Review Notice* ¶ 57. As an initial matter, while the LERG is itself a reliable source of the geographic areas to which CLECs have access with their switches, we also rely here on ported number data to make this showing. Thus, even if the Commission were concerned about the reliability of the LERG, it may rely on this alternative source of data. Moreover, as discussed below, once a CLEC has deployed a switch and is using that switch to serve business customers, it may readily expand the use of that switch to serve mass-market customers. Indeed, many competing carriers have done just that.

[15] *See UNE Remand Order* ¶ 261 ("switches deployed by competitive LECs may be able to serve a larger geographic area than switches deployed by the incumbent LEC, thereby reducing the direct, fixed cost of purchasing circuit switching capacity and allowing requesting carriers to create their own switching efficiencies."); *id.* ¶ 258

optic technologies and multi-function switching platforms have, in many cases, allowed carriers . . . to serve an entire statewide or LATA-wide customer base from a single switch platform."[16]

CLECs themselves report that they can and do use their switches to serve very large geographic areas – as large as an entire LATA, an entire state, or even multiple states. AT&T has stated that its "local switches serve geographic areas that are comparable to the areas served by SWBT's tandem switch."[17] For example, AT&T claims to serve both the entire Dallas LATA (LATA 552) and the entire Houston LATA (LATA 560) with one local switch apiece, whereas SBC serves these LATAs with 8 and 7 tandem switches, respectively, plus dozens of end-office switches.[18] Numerous other CLECs have made similar claims. *See* Table 7.

Table 7. Use of CLEC Switches to Serve Large Geographic Areas

WorldCom	"WorldCom uses state-of-the-art equipment and design principles based on technology available today . . . which makes it possible to access and serve a large geographic area from a single switch." "[W]hile WorldCom uses 4 local switches and a transport network to serve these [26] rate centers, BellSouth utilizes 5 local tandems and a multitude of end offices to serve this area."
ICG	"[T]he ICG switch provides services to customers in a geographic area at least as large as that serviced by the ILEC tandem."
AT&T	"It is important to note that in some cases, the AT&T switch serving a LATA is not physically located in the LATA."
Intermedia	"Instead of deploying a multiplicity of switches to cover an area, as is BellSouth's custom, Intermedia deploys a single switch to cover a very large area. Intermedia can do this because the switches it deploys are very capable and have a very large capacity." "From this map, it is clear that all the areas we serve in Jacksonville, Orlando, Tampa and Miami are each served by a single switch. This is a great deal of territory, all covered by four Intermedia switches."
US LEC	"For example, in the Jacksonville market, out network is designed to facilitate traffic termination to the same market as 2 BellSouth tandem switches. Our central office acts as tandem switch and as end office switch for the same 19 rate centers served by the two BellSouth switches."
Sources: See Appendix M.	

Switch manufacturers have specifically designed their equipment to meet CLECs' needs to serve large geographic areas.[19] For example, Lucent's 5ESS – the most popular circuit switch

("facilities-based competitors need not deploy switches in exactly the same network configuration as an incumbent, thus allowing competitors to achieve their own unique and competitive efficiencies by deploying their own switches.").

[16] Prefiled Direct Testimony of Michael Starkey, ICG, NC Docket No. P-582, Sub. 6 at 21 (NC PUC filed May 27, 1999).

[17] Direct Testimony of Jon A. Zubkus on Behalf of AT&T Communications of Texas *et al.*, *Proceeding to Examine Reciprocal Compensation Pursuant to Section 252 of the Federal Telecommunications Act of 1996*, Docket No. 21982, at 3 (TX PUC filed Mar. 17, 2000).

[18] *Id.* ("[T]he TCG switch in Dallas serves the entire 552 LATA which SWBT also serves with 8 tandems. In Houston, the TCG switch serves the entire 560 LATA which SWBT also serves with 7 tandems.").

[19] *See*, *e.g.*, Lucent Technologies, *5ESS 2000 – Switch Mobile Switching Center*, http://www.lucent.com/products/solution/0,,CTID+2008-STID+10048-SOID+824-LOCL+1,00.html (5ESS provides "a unique and very attractive low-cost solution . . . to support growth opportunities in startup areas where existing

among CLECs – has "[r]emote switching capabilities" that make it possible to serve customers that are 2000 miles away from the host."[20] As of December 2001, CLECs had deployed approximately 360 remote switches in addition to the more than 1,300 host switches they have deployed.[21]

CLECs also may extend their competitive reach by deploying new switches or expanding the capacity of existing switches. In the last few years, switch manufacturers have made it easier and more cost-effective than ever for CLECs to purchase and deploy new circuit switches.[22] Switches have modular designs that enable a carrier to start small and add capacity as they grow.[23] The latest generation of switches also has very large maximum capacities – as much as 600,000 lines.[24]

Second, the data are based only on conventional CLEC circuit switches, even though all forms of circuit-switched traffic (including fax, e-mail, and data) are now being switched on packet rather than circuit switches. As described in Section II.B below, CLECs are rapidly

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traffic may not justify installing a standalone" switch.); Nortel Networks, *DMS-10 Carrier Class Switching System, Remote Switching Center-S*, http://www.nortelnetworks.com/products/01/dms-10/rscs.html. (Nortel remote switches "[e]xtend[] a full complement of host switch features to subscribers up to 650 miles from a DMS-100 or DMS-500 host, up to 100 miles from a DMS-10 host.").

[20] Lucent Technologies, *5ESS Switch*, http://www.lucent.com/products/solution/0,,CTID+2002-STID+10055-SOID+935-LOCL+1,00.html ("*Lucent 5ESS Website*"); Lucent Technologies, *5ESS 2000-Switch Mobile Switching Centre (MSC)*, http://www.lucent.com/products/solution/0,,CTID+2008-STID+10048-SOID+824-LOCL+1,00.html.

[21] Telcordia, *January 2002 LERG*.

[22] *See*, *e.g.*, Lucent Technologies, *Maximize Your Opportunities With the Remoting Capabilities of the 5ESS-2000 Switch*, http://192.11.229.2/livelink/163997_Brochure.pdf (CLECs may "establish a presence in a new or small market at minimal cost," and "without making major capital investments."); P. Korzeniowski, *Pieces of Concern – The Communications Market Is One Big Puzzle, and CLECs Are Scrambling To Find the Right Fit*, tele.com (May 29, 2000) (quoting Pat Price, Lucent's director of switch product marketing: "We've cut the size of our switch in half and disabled some residential services, so a CLEC should be able to install a new central office switch in a month"); M. Reddig, *Top 10 Advances in Switching* (quoting Dan Lakey, senior market manager for CLECs, Taqua Systems: "Even the legacy switching products are consolidating common equipment into half as many cabinets and increasing port density on line and trunk modules."); Ericsson Marketing Brochure, *AXE Local 7.2*, http://www.ericsson.com/multiservicenetworks (AXE Local 7.2 switch reduces "costs for installation, operation and maintenance" with "new options for remote control [that] sav[e] time and money on service personnel.").

[23] *See*, *e.g.*, *Lucent 5ESS Website* (5ESS "allows growth in increments simply by adding modules"); Nortel Networks, *DMS-10 Carrier Class Switching System*, http://www.nortelnetworks.com/products/01/dms-10/index.html (DMS-10 is specifically "[d]esigned for small to medium applications"); Siemens Press Release, *Siemens Debuts Denser Version of Its World-Leading Class 5 Switch to Meet Service Demands and Space Limitation* (June 4, 2001) (EWSD SX switch is "finding great popularity with carriers of all sizes who need exceptional functionality on a smaller footprint.").

[24] *See*, *e.g.*, Siemens A.G., *EWSD Powernode*, http://www.siemens.ie/fixedoperators/CarrierNetworks/switching/ewsd.htm ("The EWSD PowerNode can handle up to 600,000 subscribers and 240,000 trunks per switch and it supports ultra large Remote Switching Units, which can handle up to 50,000 subscribers or 8,500 trunks. The EWSD PowerNode is based on your current EWSD infrastructure, which qualifies it as a tool to consolidate your network."); Lucent Technologies, *Products and Services – 5ESS® Switch*, http://www.lucent.com/products/solution/0,,CTID+2002-STID+10055-SOID+935-LOCL+1,00.html ("A full-sized 5ESS® switch serves up to 250,000 subscriber lines and over 100,000 trunk lines."); Nortel Networks, *Products – DMS 500: DMS 500 System Advantage*, http://www.nortelnetworks.com/products /01/dms500/collateral/74038.16-09-97.pdf (the Nortel DMS-500 can support up to 122,278 lines and 45,288 trunks).

deploying packet switches to provide data services, and also are increasingly using these switches to provide voice services. The tabulated data also exclude wireless switches, even though wireless networks now switch at least one-quarter of the amount of voice traffic as wireline networks.[25]

Third, the tabulated data exclude PBXs. The FCC and independent analysts have all reached the conclusion that PBX systems compete directly with circuit-switched services.[26] As of year-end 1998, there were 45 million installed PBX lines in the United States.[27] As of year-end 2001, the number had grown to 56 million.[28] This means that on approximately 44 percent of all ILEC switched access lines serving business customers at least some of the switching was done by a switch other than an ILEC's own circuit switch.[29]

2. Use of CLEC Switches To Serve Mass-Market Customers.

As of year-end 2001, CLECs were serving approximately *three million* residential lines using their own switches. CLECs that are serving mass-market customers using their own switches have typically done so either by expanding the services on their existing large-customer-focused networks, or by expanding the geography of their existing broad-customer-based networks into adjacent territories. This service and geographic expansion typically involves the use or extension of existing facilities, not the conversion of unbundled local switching leased from an ILEC.

Service-Based Expansion To Serve Mass-Market Customers. CLECs have generally deployed switches to serve large business customers, in the first instance. Having done so, however, it is both straightforward and cost-effective for them to use these same switches to serve mass-market customers, and facilities-based CLECs are now doing so aggressively. *See* Table 8. Indeed, the wire centers in which CLECs already are serving business customers also contain the vast majority of all residential lines. As noted above, for example, the wire centers in

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[25] *See* note 141, *infra*.

[26] *See*, *e.g.*, *Amendment of Part 69 of the Commission's Rules Relating to Private Networks and Private Line Users of the Local Exchange*, Notice of Proposed Rulemaking, 2 FCC Rcd 7441, ¶ 44 (1987) (decision to apply the surcharge to Centrex leakage as well as PBX leakage was "based upon a recognition that Centrex and PBX switches competed directly with one another."); *KLF Electronics v. Indiana Bell Telephone*, Memorandum Opinion and Order, 1 FCC Rcd 502, 503 n.3 (1986) ("Centrex service performs some of the same functions performed in a PBX, and therefore telephone exchange carriers offering Centrex compete with companies . . . that provide PBX switches."); H. Peterzell, *Centrex III – Some Other Considerations* (May 8, 1998), http://www.phonehelp.com/p-1-31.htm ("I know of nothing that can be accomplished with either of these technologies [PBX and Centrex] that cannot be accomplished with the other. Functionality, interestingly enough, is not a consideration.").

[27] Multimedia Telecommunications Association, *1998 Multimedia Telecommunications Market Review and Forecast* at 92 (1998).

[28] *Id.* (installed base of nearly 44 million PBX lines as of year-end 1997); Multimedia Telecommunications Association, *2001 Multimedia Telecommunications Market Review and Forecast* at 105, 108 (2001) (12 million new add-on PBX lines shipped between 1998 and 2001) (2001 add-on lines estimated using average percentage of shipments attributed to add-on lines, 1998-2000).

[29] This figure was derived as follows: PBX lines in use today (55,868,000) divided by combined Business Switched Access Lines and Special Access Lines (128,015,263). *FCC Statistics of Common Carriers, 2000/2001 ed.* at Table 2.4.

which CLECs have ported numbers to their own switches contain 84 percent of all BOC residential access lines, in addition to 89 percent of all BOC business lines.

Cable operators have used a comparable at-the-margin strategy for getting into mass-market voice service. Here, video and data services have provided the economic entry point that has justified the initial build out of the network. The cable telephony that has been commercially deployed to date relies on the same type of circuit-switches that ILECs and CLECs use. *See* Table 9. At least five cable operators – including AT&T, Cox, Comcast, Cablevision and Insight – have actually deployed commercial circuit switched cable telephony.[30] Circuit-switched cable telephony has been deployed in 20 states and is now available to more than 10 million U.S. homes – approximately 10 percent of the mass market.[31] More than 1.5 million homes subscribe.[32] Cable operators are adding over 70,000 customers a month for their residential telephony services.[33] By the end of 2002, circuit-switched cable telephony is expected to be available to more than 11 percent of all homes, with an estimated 2.4 million of these homes actually subscribing.[34]

In some states, cable telephony is already far more widely available than nationwide averages suggest. For example, the Commission has recognized that Cox already has the "capability to provide cable telephony service to 75 to 95 percent of Rhode Island customers."[35] AT&T offers cable telephony services to large fractions of the nearly three million homes its cable network passes in the Boston Area,[36] the approximately 600,000 homes it passes in the Pittsburgh area,[37] the 3.5 million homes it passes in the Chicago area,[38] and the 2.7 million

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[30] *See* M. Stump and K. Brown, *Comcast Plunges Into Telephony*, Multichannel News at 5 (Dec. 24, 2001); *Cabling Home*, Nashville Bus. J. at 17 (Feb. 1, 2002); *Eighth Video Competition Report*; T. Kerver, *Operator of the Year*, Cablevision (Oct. 22, 2001). There currently are two major cable operators – AT&T and Cox – and a third smaller one, Insight, that are actively deploying circuit-switched cable telephony to new areas. *See* Yahoo! Business, *AT&T and Comcast Remain On Watch Neg* (Dec. 20, 2001), http://biz.yahoo.com/bw/011220/202353_1.html; K. Darce, *Local Phone Arena Gets New Players*, Times-Picayune at 1 (Feb. 8, 2002); Insight Communications, *Services*, http://www.insight-com.com/services/.

[31] *See JP Morgan Cable Industry Report* at Table 22; *NCTA Cable Telephony Report* at 2.

[32] *See* NCTA, *US Cable Telephony Subscribers (in Thousands 1998-2001*), http://www.ncta.com/industry_overview/indStats.cfm?statID=13.

[33] *See NCTA Cable Telephony Report* at 1.

[34] *See JP Morgan Cable Industry Report* at Table 22.

[35] *See*, *e.g.*, *Rhode Island Order* ¶ 105.

[36] *See* Dan Somers, President and CEO, AT&T Broadband, *Operational Overview*, AT&T Broadband, Investor Presentation, July 2001, at 16 (stating that AT&T's network in Boston has "2.9 million homes passed," that "plant upgrades [are] nearly complete, [to be] able to offer complete bundle," and that there is already "11% telephony penetration" and ">100k customers.").

[37] As of mid-2000, AT&T offered cable telephony to at least 165,000 of its approximately 400,000 subscribers in the Pittsburgh Area. *See Company Offers Free Phone Service in Bid for Customers*, Associated Press State & Local Wire (Aug. 31, 2000); NCTA, *Top 25 Cable Systems*, http://www.ncta.com/industry_overview/aboutIND.cfm?indOverviewID=56. AT&T's network passes roughly 600,000 homes, assuming a nationwide cable penetration rate of approximately 66 percent.

[38] *See* Dan Somers, President and CEO, AT&T Broadband, *Operational Overview*, AT&T Broadband, Investor Presentation, July 2001, at 17 (stating that AT&T's network in Chicago has "3.5 million homes passed," a

homes it passes in the Bay Area.[39] And, as discussed below, most major cable operators have stated that they soon plan to deploy cable telephony even more broadly by relying on packet-switched, IP-based technology.

Table 8. CLECs Providing Facilities-Based Residential Service

CLEC	State	
ALLTEL	AR, FL, NC, NE, OH, PA	"ALLTEL began offering local telephone service to area [Raleigh] residents this week, two months after launching local telephone service to [Raleigh] area businesses."
AT&T	CA, CT, FL, GA, IN, KY, MD, MA, MN, NH, PA, UT, VA, WA	"AT&T Broadband now markets cable telephony to approximately seven million households in 16 markets, has over one million customers (or 14.8% of its marketable homes with penetration rates reaching 30% in some communities), and continues to expand the availability of competitive local telephony services to homes throughout the former TCI and MediaOne footprints."
BayRing	NH	"BayRing owns and operates two CLASS 5 Digital Switches that are housed at the Pease International Tradeport in Portsmouth, NH"; "offers residential and business customers competitively priced local, long distance, Internet and dedicated access services."
Broadview Networks	MA, NJ, NY, PA	"Broadview Networks…is a network-based electronically integrated communications provider (e-ICP) serving small and medium-sized businesses and communications-intensive residential customers in the northeastern and mid-Atlantic United States."
Cablevision	CT, NJ, NY	"[Cablevision] provides residential telephone and cable modem internet access service in portions of the greater New York City metropolitan area and parts of southern Connecticut." "At December 31, 2000, the Company served approximately 239,000 modem subscribers and approximately 12,000 residential telephone subscribers."
Cavalier Telephone	DE, MD, PA, VA	"Cavalier targets business and residential customers, the latter composing 60 percent of its customer base. It generally markets residential services to employees of the various businesses it serves."
CenturyTel	LA	"The Company is currently offering CLEC services to residential and small and medium sized business customers in Shreveport and Monroe, LA. CenturyTel will employ an 'edge-out' strategy for its CLEC expansion."
Comcast	MI	"It now seems that Comcast has 15,000 circuit-switched telephony customers across a base of 150,000 homes passed in 12 Michigan towns, including Ann Arbor, Birmingham and Dearborn."
CoreComm	IL, MI, OH, PA, WI	"CoreComm is a national, partially facilities-based CLEC serving both the residential and the business markets, primarily in the Midwest and the Northeast."
Cox	AZ, CA, CT, LA, NE, OK, RI	"[B]y March 31, 2001 Cox Communications was serving 300,000 residential customers using 410,000 residential access lines, making Cox the equivalent of the 12th largest telephone company in the country."
CTC Exchange	NC	"The CLEC is deploying two strategies…The second as a Greenfield that the Company calls SLEC…building infrastructure in new residential and business developments."

"strong telephony roll-out" with "backbone and headend segments of rebuilds nearly complete," "18% telephony penetration" and "some suburbs have 40% penetration.").

[39] *See id.* at 18 (stating that AT&T's network in the Bay Area has "2.7 million homes passed," "backbone and headend segments of rebuilds nearly complete," "19% telephony penetration" and "many communities in high 20s").

Table 8. CLECs Providing Facilities-Based Residential Service		
CLEC	**State**	
CTSI	NY, PA	"CTSI will continue to focus on its three original 'edge-out' markets (Wilkes-Barre/Scranton/Hazleton, Harrisburg and Lancaster/Reading/York, PA). CTSI has its own host switches in Harrisburg and in Wilkes-Barre, PA. CTSI serves the Lancaster/Reading/York market with remote switches connected by fiber to CTSI's Harrisburg host switch."
Grande Communications Network, Inc.	TX	"Grande Communications is building a ground-up deep fiber broadband network to homes and businesses. Grande will deliver high-speed Internet access, local and long distance telephone and cable television entertainment services over its own advanced broadband network to communities in Texas."
Insight	KY	"Insight Communications Co. is moving forward on a cooperative voice deal it signed last year with AT&T Broadband. Insight has rolled out primary-line cable telephony in Louisville, Ky., a system that serves 25,000 marketable homes."
Knology	AL, FL, GA, SC, TN	"Knology Broadband offers residential and business broadband services, including analog and digital cable television, local, and long distance telephone, high-speed Internet access service, and other services including broadband carrier services (BCS) using two-way high capacity hybrid fiber/coaxial Interactive Broadband Networks."
LecStar	AL, FL, GA, KY, MS, NC, SC, TN	"LecStar Corporation is a facilities-based integrated communications carrier (ICC)." "LecStar offers a full array of fixed wire-line voice, data, Internet and operator services to business and residential customers throughout BellSouth's Southeastern operating territory."
NTELOS	KY, VA, WV	"NTELOS Inc…is a regional telecommunications provider offering a wide range of services to business and residential customers in Kentucky, Virginia and West Virginia." "NTELOS is pursuing an edge-out build strategy. NTELOS enters markets that are physically proximate to its existing ILEC operations and uses its brand and existing infrastructure to expand into them."
NTS Communications, Inc.	NM, TX	"The Company currently offers facilities-based local telephone service in the cities of Amarillo, Lubbock, Abilene, Wichita Falls, Midland/Odesa, San Angelo, and San Angelo TX, and also in Albuquerque, NM." "With NTS's facilities-based local dial tone product, you use NTS's network facilities – not those of the traditional telephone company."
RCN	CA, DC, MA, NY, PA	"Our multi-service network is presently operating in Boston, Manhattan, Lehigh Valley, Washington, D.C., San Francisco, Queens, Chicago, and Philadelphia. . . . The Company's telephone switching network utilizes either the Lucent 5ESS-2000 or the Nortel DMS-100 switching platforms as the local switching element, and the network is designed to provide highly reliable lifeline telephony service. In each of the markets which are operational, a telephone switch is installed and fully operational."
Rio	OR	"Rio Communications has invested $1 million to set up its own switch in Eugene, said Ed Marcotte, president and part-owner of Rio. The 5-year-old, Eugene-based firm operates roughly 1,000 phone lines, serving about 30 customers. It is adding about 500 business lines a month and hopes to launch residential service by the fall, Marcotte said."
Sources: See Appendix M.		

Table 9. Commercial Circuit-Switched Cable Telephony Deployment			
	Homes Passed for Cable Telephony	**Cable Telephony Subscribers**	**Future Plans**
AT&T	approximately 7 million	1 million (EOY2001)	AT&T expects to expand service to approximately 5-6 million homes per year
Cox	Orange County; San Diego; Omaha; Oklahoma City; Phoenix; Tucson; RI; CT; Tidewater area, VA	400,000 (EOY2001)	"Since December [2001], Cox has launched residential phone service over its cable television network in St. Charles and St. Bernard parishes. Phone service will be extended to Jefferson Parish by mid-summer [2002] and to Orleans by the end of the year, Cox spokesman Steve Sawyer said."
Comcast	150,000	40,000 (EOY2001)	Using AT&T switches, plans soon to deploy circuit-switched telephony to 1 million Comcast homes
Cablevision	Long Island, NY	12,500 (June 2001)	Plans to deploy IP Telephony more broadly
Insight	Louisville, KY	2,000 (Oct. 2001)	The first telephony customers have been connected in parts of the Louisville, KY and Evansville, IN systems, with launches to follow in Lexington, KY and Columbus, OH later this year.
Sources: See Appendix M.			

Geographic Expansion to Mass-Market Customers. As discussed in more detail in Section IV.B.3, a number of incumbent local exchange carriers have been pursuing edge-out strategies, pushing into the territories of adjacent ILECs.[40] For example, CTSI – the CLEC subsidiary of Commonwealth Telephone (the second largest ILEC in Pennsylvania) – operates a competitive voice network in Verizon's service territory in Wilkes-Barre, Harrisburg, and Lancaster that serves business and residential customers.[41] ALLTEL has deployed competitive facilities – including switches – adjacent to its ILEC service territories in Little Rock, Charlotte, Cleveland, Jacksonville, and Tallahassee.[42]

Some existing cable telephony providers also are engaging in geographic expansion, and many other cable operators could no doubt do so. For example, AT&T's merger partner,

[40] *See, e.g., NPRG CIOC Report 2001*, Ch. 2 at 1 ("[Competitive Independent Operating Companies ('CIOCs')] target RBOC markets that are geographically proximate to their existing ILEC holdings. This 'edge-out' strategy allows the CIOC to take advantage of the synergy of its ILEC and CLEC operations while entering typically underserved non-urban markets. CIOCs are able to employ infrastructure, brand, and local experience to gain market penetration and achieve profitability."); *id*. Ch. 2 at 2 ("All CIOCs target business customers and depending on individual market characteristics, also target residential customers through the use shared lines or through infrastructure overbuilds.").

[41] *See* Commonwealth Telephone Enterprises, Inc., Form 10-K (SEC filed Mar. 27, 2001); *NPRG CLEC Report 2001, 14th ed.*, Ch. 13 – CTSI, Inc. at 7; CTE Press Release, *CTE Announces Restructuring of CTSI Subsidiary* (Dec. 6, 2000).

[42] *See* ALLTEL, *Coverage Maps: National Map*, http://www.alltel.com/news_information/maps/download/bigjpgs/US.jpg; *NPRG CIOC Report 2001*, Ch. 7 at 8-9. In March 2002, ALLTEL announced that it will discontinue its CLEC operations in seven of ten states (representing less than 20 percent of ALLTEL's CLEC access lines); however, the company has not identified which states will be affected by this change. *See* ALLTEL Corp., Form 10-K405 (SEC filed Mar. 5, 2002).

Comcast, states that it can easily and cheaply use AT&T's existing switches to provide residential telephony service to Comcast's existing cable subscribers.[43] Comcast's Treasurer, John Alchin, states that "'when you look at what AT&T has already done in terms of infrastructure and the huge investment they've made . . . we can more easily piggyback off that in an economically efficient way.' Between 70% and 80% of Comcast's existing systems are within 'striking distance' of existing AT&T Broadband switching services . . . 'making the incremental roll-out of telephony in Comcast legacy systems compelling.'"[44] Comcast plans to roll out circuit-switched phone service to as many as one million Comcast households upon closing its proposed merger with AT&T.[45]

Collocation and Hot-Cut Issues. As discussed in Section IV.A, CLECs that serve large business customers with their own switches typically do so directly through fiber connections they have deployed. Mass-market customers do not always generate enough traffic to justify a fiber link, so many CLECs that seek to serve such customers with their own switch will do so through an unbundled loop obtained from an ILEC. In order to do so, the CLEC will first obtain collocation in the ILEC's central office. Where the customer that the CLEC seeks to serve already is receiving dial-tone service from the ILEC, the CLEC will typically request that a hot cut be performed on the loop serving that customer. A hot cut involves moving the end-user customer's loop from the ILEC's switch to the CLEC's switch.

At the time of the *UNE Remand Order* the Commission declined to curtail availability of the switching UNE primarily because of the time and cost associated with obtaining collocation space and local loops through the hot-cut process.[46] Concerns about collocation and hot-cut performance have been fully addressed since the time of the last UNE review, however.

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[43] *See*, *e.g.*, *Cable Companies Tell Analysts They're Confident About Prospects*, Warren's Cable Regulation Monitor (Jan. 14, 2002) ("With switches already in place in 8 of 10 biggest U.S. markets, only $5-$50 million is needed to be invested to complete phone service for residences."); M. Farrell, *AT&T Wants to Tweak Digital Packages Again*, Multichannel News (Jan. 14, 2002) ("[Comcast President Brian] Roberts had been lukewarm on cable telephony in the past – before the merger agreement, Comcast had said repeatedly that it would wait for lower-cost Internet-protocol telephony to become a reality – but he's now one of its biggest proponents. . . . Roberts said telephony can be rolled out in Philadelphia and Detroit for between $5 and $50 per customer, because AT&T has already invested in the switching infrastructure in those markets. That $5 to $50 cost would mainly power the phone service at each customer home."); J. Borland, *Comcast, AT&T Cable Deal To Create Net Giant*, CNET News.com (Dec. 20, 2001) ("Steve Burke, president of Comcast Cable, said in Thursday's conference call that introducing phone services to Comcast customers could generate $600 million to $800 million annually within the next five years. 'If we overlay their expertise, their investment, their people and learning, and roll out telephony to our footprint, it could represent a very significant opportunity,' he said.").

[44] M. Scanlon, *AT&T Broadband Deal Lets Comcast Accelerate Telephony*, Cable World (Jan. 7, 2002).

[45] *See* Applications and Public Interest Statement of AT&T Corp. and Comcast Corporation at 38, *Application for Consent to the Transfer of Control of Licenses, Comcast Corporation and AT&T Corp., Transferors, to AT&T Comcast Corporation, Transferee*, MB Docket No. 02-70 (FCC filed Feb. 28, 2002) ("Comcast President (and AT&T Comcast CEO) Brian L. Roberts has announced that the merged company intends to begin to deploy telephone service in the Philadelphia and Detroit markets currently served by Comcast, after closing, bringing facilities-based local telephone choice to about one million additional homes.").

[46] *See UNE Remand Order* ¶¶ 269-271.

The Commission has expanded the range of collocation options and imposed standard time limits.[47] And collocation in BOC regions has risen very sharply. At the end of 1998, for example, CLECs had obtained roughly 4,000 collocation arrangements in BOC regions; by year-end 2001 there were approximately 25,000 CLEC collocation arrangements in place. CLECs are now collocated in central offices that serve approximately 81 percent of BOC access lines – including approximately 79 percent of BOC residential lines. *See* Table 10.

Table 10. Collocation by Region

	Verizon	SBC	BellSouth	Qwest	Total
Collocation Arrangements YE 1998	1,100 (excl. GTE)	2,000	870	240	**4,300**
Collocation Arrangements YE 2001	7,000	9,900	4,700	3,300	**24,900**
% of Residential Lines in WCs served by collocation	74	83	77	84	**79**
% of Business Lines in WCs served by collocation	84	87	87	90	**86**
% of Total Lines in WCs served by collocation	78	85	80	86	**81**

Totals may not equal sum of parts due to rounding.

The availability in the market of alternatives to traditional collocation also has been greatly expanded in recent years due to the rapid rise of alternative collocation providers (so-called collocation "hotels"), which give competitive local carriers places to deploy their switches and interconnect their networks. These companies provide "high-security facilities operated by independent companies that put telecom gear as close as possible to incumbent central offices without actually being there."[48] They permit CLECs to "easily connect with, and hand off traffic to, the IXCs and each other."[49] They allow "[m]ost new business telecom providers . . . to bypass the traditional infrastructure."[50] Today, there are alternative collocation providers in virtually all major metropolitan areas throughout the country. *See* Appendix G.

With respect to hot cuts, any concerns about hot-cut performance have been reduced as both sides have gained further experience and worked out the rough spots in their respective processes. Indeed, since the *UNE Remand Order*, the FCC has repeatedly found that BOC

[47] *See*, *e.g.*, *Deployment of Wireline Services Offering Advanced Telecommunications Capability*, Order on Reconsideration and Second Further Notice of Proposed Rulemaking, 15 FCC Rcd 17806 (2000); *Deployment of Wireline Services Offering Advanced Telecommunications Capability*, Fourth Report and Order, 16 FCC Rcd 15435 (2001).

[48] D. Culver, *Construction Boom for Colocation*.

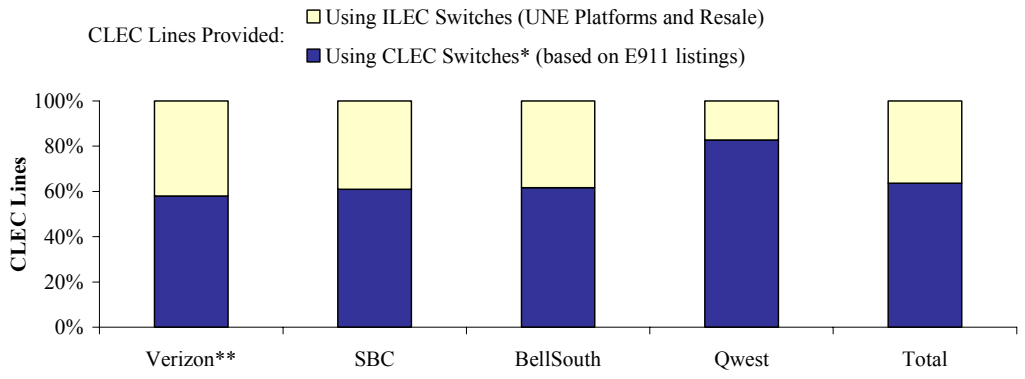
[49] A. Lindstrom, *Checking Out Carrier Hotels,* America's Network (Nov. 1, 1997).

[50] V. McCarthy, *Local Carriers Take Over Office Buildings,* Interactive Week (May 22, 2000), http://www.zdnet.com/intweek/stories/news/0,4164,2574580,00.html (quoting Sean Dohety, president, Urban Media).

performance in providing hot-cuts to CLECs is satisfactory.[51] And, as demonstrated in Appendix H, the Bell companies' hot-cuts performance is now excellent.

Migration of Mass-Market UNE-P Customers to CLEC Switches. Collectively, CLECs use their own switches to serve most of their customers. *See* Figure 3. Some CLECs, however, continue to rely primarily on the UNE Platform, which of course includes the switching element, to serve mass-market customers.[52] These CLECs maintain that they remain dependent on ILEC switches to serve mass-market customers because they "cannot rationally invest in switches . . . until they have used UNE-P to build up a customer base."[53] But that assertion cannot be squared with the economics of switch deployment, and with the actual marketplace track record that other CLECs have established.

Figure 3. Breakdown of CLEC Lines by Mode of Entry



*The number of lines provided entirely over CLEC facilities and using CLEC switches is based on the number of E911 listings CLECs have obtained. Because the actual number of lines that CLECs are serving with their own switches is likely much higher, this method will, if anything, understate the percentage of all lines that CLECs are serving in whole or in part over facilities they have deployed themselves.
**Verizon data do not include the former GTE territory.

It certainly is clear that some CLECs are not migrating mass-market UNE-Platform customers to their own facilities, and have no plans ever to do so. In New York, for example, AT&T and WorldCom together provide UNE-P service to well over one million residential customers[54] – enough customers, in other words, to fill five to ten switches. Together, AT&T

[51] *See*, *e.g.*, *New York Order* ¶ 291; *Massachusetts Order* ¶ 159; *Connecticut Order* ¶ 13; *Pennsylvania Order* ¶ 86; *Texas Order* ¶ 256; *Kansas/Oklahoma Order* ¶ 199; *Arkansas/Missouri Order* ¶ 102.

[52] In the Bell companies' regions, approximately two-thirds of all platforms are used to serve residential customers, and the percentage is even higher in Verizon's and SBC's regions (80 percent and 70 percent, respectively). Most of the platforms used in the business sector appear to be used to serve small business customers, which the FCC previously has held are part of the same "mass market." *See*, *e.g.*, *Bell Atlantic/NYNEX Merger Order* ¶ 70. For example, nearly 25 percent of all platforms used to serve business customers are sold in BellSouth's region, and half of those are sold to business customers with only 1-3 lines.

[53] Ex Parte Letter from Robert W. Quinn, AT&T, to William F. Caton, FCC, CC Docket No. 01-347 (Mar. 1, 2002).

[54] S. Alexander, *Judge Recommends Qwest Be Fined for Impeding Local Service by AT&T; But AT&T Says It Won't Enter Market*, Star Trib. (Feb. 26, 2002) (AT&T vice president Tom Pelto said that AT&T uses the UNE-Platform to provide local residential phone service to about 1 million people in New York.); M. McDonald, *Local*

and WorldCom also operate 28 local circuit switches in New York state.[55] Yet these two carriers do not appear to have converted any residential customers in New York to their own switches.[56] The experience has been no different in other states where AT&T and WorldCom have signed up large numbers of UNE-P customers. Other CLECs that have obtained UNE Platforms to serve mass-market customers also have conceded that they have no plans to convert these customers to their own switches, even after they have acquired a large customer base. They view UNE-P competition as an end in itself, rather than as a stepping stone to facilities-based competition.

Their position is based on business judgment, however, not on any economic imperatives. The UNE-P-forever CLECs have simply decided that there is more to be gained from relying on UNEs at TELRIC prices than from deploying their own facilities.

To begin with, many other CLECs *are* deploying switches to serve mass-market customers. Indeed, most of the CLECs that have deployed one or more switches, and that also serve mass-market customers, make little if any use of unbundled BOC switching. Leaving aside service provided over cable networks, at least nine CLECs in Bell company regions provide facilities-based service to 25,000 or more residential lines (based on their E911 listings). *See* Figure 4. Seven of the nine buy *no* UNE-P service at all. The remaining two represent only 3 percent of all facilities-based residential lines. But for one of these two CLECs, UNE Platforms represent only five percent of the residential lines that this carrier serves.

The same circuit switch in the same wire center can and routinely does serve both business and residential customers – ILECs use *their* switches in precisely that way, and many CLECs do too. For example, many of the cable operators that are now providing circuit-switched cable telephony are doing so using switches deployed originally by their CLEC affiliates to serve business customers.[57] With switching, perhaps more so than with any other

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Phone Fight Gets Put on Hold, Crain's N.Y. Bus. at 1 (Mar. 5, 2001) (WorldCom accumulated 400,000 customers in New York).

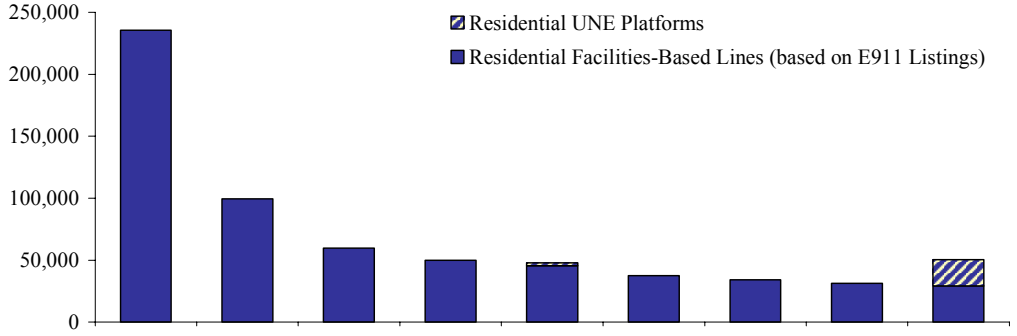
[55] *See* Appendix B.

[56] *See* Declaration of Vijetha Huffman ¶ 5, *attached to* Comments of WorldCom, Inc., *Application of Verizon New Jersey, Inc., Bell Atlantic Communications, Inc. (d/b/a Verizon Long Distance), NYNEX Long Distance Company (d/b/a Verizon Enterprise Solutions), Verizon Global Networks Inc. and Verizon Select Services Inc. for Authorization To Provide In-Region, InterLATA Services in New Jersey*, CC Docket No. 01-347 (FCC filed Jan. 14, 2002) ("UNE-P . . . is the only service-entry vehicle that WorldCom uses to offer local residential service, and it is the only service-delivery option that WorldCom currently views as even potentially viable."); Supplemental Declaration of Michael Lieberman on Behalf of AT&T Corp. ¶ 20, *attached to* Ex Parte Letter of Peter Keisler, Sidley Austin Brown & Wood (representing AT&T), to William F. Caton, FCC, CC Docket No. 01-324 (Feb. 8, 2002) (AT&T has recently stated that it has not pursued a strategy of converting platform customers to its own facilities "to provide basic local residential service to customers anywhere in the country.").

[57] *See*, *e.g.*, K. Zia, Deutsche Banc Alex. Brown, Investext Rpt. No. 8089704, Cablevision Systems Corp. – Company Report at *5 (Apr. 16, 2001) ("On the cable telephony front, Cablevision has introduced a switched-circuit residential solution in its Long Island, NY and Connecticut markets, which leverages the infrastructure and switches of its CLEC subsidiary, Lightpath."); K. Zia, Deutsche Banc Alex. Brown, Investext Rpt. No. 8089709, Adelphia Communications – Company Report at *6 (Apr. 16, 2001) ("Adelphia plans to roll out residential telephony using packet-switched (IP) technology in 2002, with the substantial advantage over most others in the industry of being able to tap its relationship with its CLEC subsidiary Adelphia Business Solutions. Leveraging ABS's already laid fiber, switches, co-location agreements with ILECs and back-office infrastructure, should provide Adelphia with significant time-to-market and cost structure advantages.").

network element, residential service can readily be added at the margin. And the vast majority of residential customers are now in reach of CLEC switches already in operation. CLEC switches are up and running in wire centers that serve 86 percent of all BOC access lines. And these same wire centers serve about 84 percent of BOC residential lines.

Figure 4. Use of UNE Platforms by CLECs Providing Service to 25,000 or More Residential Lines Using Their Own Switches*



*Excludes CLECs providing service over cable facilities. Does not include CLECs in Qwest's region.

CLECs providing service to 25,000 or more facilities-based residential lines include: ALLTEL, Broadview, Cavalier Telephone, Intermedia, Knology, McLeodUSA, RCN, TDS, and TOTALink.

The only other justification that CLECs have given for their failure to convert mass-market customers from Platforms to their own switches relates to the cost of migrating the customer, not the cost of deploying or operating the switch itself. This does not establish that the UNE Platform is necessary for competition; to the contrary, it establishes that facilities-based competition will develop faster if CLECs do not build their customer base on UNE-P service at all.

As described above, the costs associated with collocation have fallen sharply since the *UNE Remand Order*, as the Commission has created numerous alternatives to traditional physical arrangements. The rates for hot cuts are set using TELRIC principles, and the BOCs' hot-cut performance is closely monitored by state commissions. As a result, the transactional costs that CLECs seeking to use their own switch must incur are no different than the costs that any other network provider – including ILECs and cable companies – would need to incur to connect loops to its own switches.

But even assuming that hot-cut costs remain significant, substantial numbers of customers that seek phone service are entirely "new" customers in that they are first-time subscribers at the location at which they are requesting service. Wireline telephone companies add approximately six million subscriber lines each year.[58] And, because people move, a significant fraction of existing customers terminate their current phone service and initiate new service at some other location every year.[59] Together, these two groups define a large base of

[58] *See FCC Trends in Telephone Service, Aug. 2001 ed.* at Table 8.1.

[59] *See*, *e.g.*, U.S. Census Bureau, *Statistical Abstract of the United States: 2001* at 28 (Nov. 2001) (from 1999-2000, 15 percent of the U.S. population, or approximately 40 million people, changed residences).

customers who can be served without incurring the transaction costs associated with moving an established customer off of an ILEC switch and on to a CLEC alternative.

B. Packet Switches as Substitutes for Circuit Switches.

CLEC packet switches are already a very significant competitive alternative to ILEC circuit switches.

Packet switches substitute for circuit switches to the extent that traffic can be routed directly to a packet switch, without first being routed through a circuit switch. All forms of telecommunications traffic can now be transmitted and switched, end-to-end, in digital rather than analog format. And because packet switches are far more efficient in handling digital traffic than circuit switches, the economics of migrating traffic from circuit to packet switches have become incredibly compelling. Indeed, there already is far more data traffic than voice traffic, even on the circuit-switched public telephone network.

Of course, the CLEC packet switches in many cases also either are or are capable of being used to provide voice services. Long-distance carriers have been migrating their traffic to high-speed packet switches for several years. Having gained a robust, profitable entry point in high-speed data, *local* providers are now offering messaging and voice services over those networks too. The number of customers with local data links to packet switches is already large and growing very rapidly. And a large and growing share of these data links connect to packet switches that competing carriers – including CLECs, wireless carriers, and cable providers – own and operate.

Direct Customer Links to Packet Switches. At the time of the last UNE review, 98 percent of online households still relied on dial-up connections – and thus on ILEC circuit switches – for their data services.[60] As discussed further in Section IV.C, however, nearly eight million residential users – or roughly 9 percent of online households – now have broadband cable or wireless data links instead, which bypass ILEC networks completely, and terminate directly on a competitive packet switch.[61] If all eight million of these broadband users would otherwise be using dial-up connections, the packet switches used to provide these broadband services now displace at least 4 percent of all circuit-switched minutes of use, even assuming that the average data line is used only as much as the average voice line.[62] The total would be far higher if one takes into account the fact that data calls generally last much longer than voice calls, and that data lines are therefore used much more, on average, than voice lines.[63]

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[60] *JP Morgan Cable Industry Report* at Table 13. *See also* D. Lathen, Cable Services Bureau, FCC, *Broadband Today: A Staff Report to William E. Kennard, Chairman, Federal Communications Commission, On Industry Monitoring Sessions Convened by Cable Services Bureau* at App. A (Oct. 1999).

[61] *See Gartner U.S. Consumer Telecommunications and Online Market Report* at Table 7-1; *Morgan Stanley Cable Modem/xDSL Report* at Exh. 3 (cable modem).

[62] This was derived as follows: (8 million cable/wireless broadband lines)/(174 million ILEC access lines + 8 million cable/wireless broadband lines). *See FCC Local Competition Report, Feb. 2002 ed.* at Table 1 (as of June 2001, the ILECs served 174 million access lines, which has been declining in each of the last three years).

[63] *See, e.g.,* T. Taesler, *Home Internet Solution – Always-On Internet Access*, Ericsson Review, Special Issue (1998), http://www.ericsson.com/about/publications/review/1998_01b/article42.shtml ("In general, Internet call

The competitive impact is certainly at least double that, when one adds in the effect of data traffic from business customers, and takes into account the fact that high-speed data links carry far more traffic per user than low-speed voice links.[64] Indeed, a recent study found that, for the first time, total hours spent on the Internet using high-speed connections have eclipsed the number of hours spent using dial-up connections.[65] And broadband access usage is growing at more than 60 percent a year, while dial-up access usage is steadily declining.[66]

Cable and DSL providers (ILECs among them) are now adding new broadband data connections at a rate of some five million new connections a year.[67] Cable supplies about two out of three of these connections.[68] But even if they are using DSL services over ILEC loops, these customers no longer rely on the ILEC switch to route their data traffic: a splitter in the central office diverts data traffic directly to a packet-switched network before it ever reaches an ILEC circuit switch.[69]

Many business customers likewise rely on high-capacity connections of some kind – such as T-1 lines, or higher capacity loops – to provide direct connections between their LANs and their data carriers. As discussed in Sections III.B and IV.A, CLECs have deployed extensive fiber networks to connect business customers directly to packet-switched networks.[70] In addition, there are a large number of carrier-agnostic wholesale fiber suppliers that operate fiber networks in most major metropolitan areas.[71] And the economic viability of deploying fiber is increasing as the demand for greater bandwidth continues to grow at rapid rates.[72]

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sessions last about 10 times longer than voice phone calls: 30 to 40 minutes on average, compared to the 3- to 4-minute duration of a voice call."); Lucent Press Release, *Lucent Technologies Media Gateway Enhancements Complement Lucent Softswitch, Providing Path to IP-Based Networks* (Jan. 16, 2001) ("Most people access the Internet by using dial-up modems connected through the public switched telephone network (PSTN). Those calls tend to last much longer than voice calls, which use up more channels and create congestion on the Internet."); S. Deng, *Engineering and Economic Benefits of Off-loading Dial-Up Traffic from the PSTN*, Nortel Networks White Paper (July 1999), http://www.nortelnetworks.com/products/library/collateral/80009.25-07-99.pdf ("The emergence of dial-up traffic is changing the PSTN traffic pattern considerably, causing network congestion. An average dial-up call lasts 20 minutes (or 12 CCS versus three CCS for a voice call), and 40 percent of the calls last an hour or longer.").

[64] *See*, *e.g.*, *Broadband 2001* at Charts 16 and 17 (as broadband users, survey participants spent on average 21.4 hours per month online, as compared to 15.9 hours with a narrowband connection. These same users also spent more time per session (32 minutes vs. 21 minutes), spent more days online (18 vs. 17) and viewed more pages per month (1,828 vs. 1,561)); Jupiter Media Metrix Press Release, *Over 40 Percent of US Online Households to Connect Via Broadband by 2006, Reports Jupiter Media Metrix* (Oct. 17, 2001) ("Broadband consumers continue to use their connections more intensively than narrowband consumers do").

[65] *See Broadband Access Usage Outpaces Dial-Up Access*, Reuters (Mar. 5, 2002).

[66] *See id.*

[67] *See TeleChoice DSL Deployment Summary* (residential DSL); *Morgan Stanley Cable Modem/xDSL Report* at Exh. 3 (cable modem).

[68] *See TeleChoice DSL Deployment Summary*; *Morgan Stanley Cable Modem/xDSL Report* at Exh. 3.

[69] *See* G. Garceau, *Network Access Economies*, Telcordia Technologies White Paper (Apr. 12, 1999).

[70] *See also* Appendix K.

[71] *See* Section III.C.

[72] *See id.*

Wireless services provide additional links to packet-switched networks. Paging spectrum is now being used extensively for e-mail and instant messaging, and new devices to support such services are emerging rapidly.[73] Cell phones, paging services (like the BlackBerry service), and personal digital assistants (PDAs) now provide wireless e-mail that is superior to dial-up wireline in that it is both mobile and "always on."[74] The Commission's *Sixth CMRS Report* concluded that about 2.5 million customers, or about 2.3 percent of all mobile telephone subscribers, were using wireless web services at the end of 2000.[75] A more recent analyst report found 6.7 million users of wireless data services.[76] Wireless data has grown from a virtually non-existent market in 1998 to $250 million in 2001, and is expected to grow to $2 billion by 2003.[77]

An increasing number of business customers also are making direct connections to packet switches using a new generation of IP-Based PBXs.[78] Although IP-PBX devices invariably provide connections (through a trunk) to the circuit-switched network, one of their key advantages is to send a great deal of voice traffic over private data networks such as a corporation's local area network or wide area network. Because traffic remains on a private network, rather than going on to the public Internet, the corporation can configure the network to optimize quality to ensure high-level voice communications.[79] IP-PBXs cost less to purchase and operate than traditional PBXs,[80] and are more flexible in terms of adding new services.[81]

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[73] *See*, *e.g.*, R. Cihra, ING Baring Furman Selz, Investext Rpt. No. 2422947, Palm Inc. – Company Report at *5 (Jan. 4, 2001) ("We see huge consumer and wireless Internet potential for handhelds, with their largest, yet still relatively untapped, opportunity in the corporate enterprise."); R. Cihra, ABN AMRO, Investext Rpt. No. 8264582, PC System & Appliances: Things to Watch in '02 – Industry Report at *2 (Nov. 7, 2001) ("[w]e see handhelds increasingly being deployed as mobile thin-clients for business-critical data access/entry."); *Legg Mason Wireless Industry Scorecard* at 28 ("We believe continued uptake of two-way messaging and lower-speed wireless data products will increase familiarity and acceptance").

[74] *See Sixth CMRS Report* at 56-74.

[75] *Id.* at 60.

[76] *See Legg Mason Wireless Industry Scorecard* at Exh. 11.

[77] *See JP Morgan Telecom Services 2001 Report* at Table 1.

[78] *See*, *e.g.*, A. Sulkin, *On-Going Evolution of IP-PBX Systems*, Bus. Comm. Review at 14 (May 1, 2000) ("The core architecture platform of PBX systems is undergoing an important transition from circuit-switched to packet-switched transmission and coding techniques."); C.Wilde, *IP PBX Basics*, Informationweek.com News (May 14, 2001), http://www.informationweek.com/shared/printArticle?article=infoweek/837/ ippbx_side.htm&pub=iwk. (An IP-PBX "delivers PBX-like services, but over IP-based LANs or WANs rather than circuit-switched networks.").

[79] *See*, *e.g.*, *VoIP: Shouldn't You Be Using It?*, Distribution Management Briefing at 14 (Nov. 27, 2001) ("With a private data network . . . an organization can . . . optimize . . . [b]y labelling voice packets, prioritising them over other traffic and using queuing techniques and buffers to control the flow of packets, organizations can ensure that packets are delivered to their destination at a constant rate."); Communications Daily at 7 (Jan. 23, 2002) (Companies that have converted their traditional PBX systems to IP local area networks report that they are "satisfied with the reliability and voice quality of these initial systems") (quoting results of study by InfoTech, *IP LAN Telephony: Probing the Shift in Market Demand*); A. Joch, *Enterprises Tuning in to a Brand-new Voice - Satisfied with Service Quality, Many Enterprises Are Expanding VOIP Use*, eWeek at 41 (June 25, 2001) (IP-PBX vendors – including 3Com and Cisco – now incorporate data-coding protocols into their VOIP hardware to give voice packets network priority when there's heavy network traffic).

[80] *See*, *e.g.*, M. Desmond, *Enterprise Technology: IP Telephony Goes to Work*, PC World.com (Aug. 2001) ("For growing small businesses – 200 users or more – 'Cisco makes [an IP] gateway that's about $25,000. But when you look at an investment into a PBX, it's typically $150,000 to $200,000 for comparable hardware.'") (quoting Ken Camp, Mill Associates); D. Drucker, *Modest Victories for VoIP – While big enterprises ponder over deployment,*

According to analyst studies, "17 percent of U.S. businesses began the implementation of IP LAN telephony in the year 2000,"[82] and, as of year-end 2001, "[m]ore than 40% U.S. companies with 500 employees or more have begun conversion of phone systems to IP telephony."[83] Analysts predict that, within the next four years, more than 80 percent of all U.S. enterprises will adopt some form of VoIP.[84] According to Frost & Sullivan, the North American IP-PBX market generated $375 million in 2000, and is expected to reach $4.8 billion by 2007.[85]

Packet Switching is Fully Competitive. The Commission has already concluded that CLECs stand on equal footing with ILECs in their ability to deploy and operate packet switches.[86] Since the last UNE review, the installed base of CLECs' packet switches has jumped from 860 to at least 1,700.[87] More than 55 CLECs have deployed packet switches.[88] *See* Appendix E. CLECs have deployed packet switches in more than 200 different cities. *See id.* In the top 100 MSAs, the average number of packet switches per MSA has grown by an average of nearly 150 percent since the last UNE review. *See* Table 11.

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smaller users find savings, InternetWeek at 24 (Sept. 17, 2001) ("The IP PBX cost about one-quarter of what a traditional PBX deployment would have cost."); S. Sleeper, *Networking Giant Finds Its Voice*, Investor's Bus. Daily (May 29, 2001) ("Because they are Web-based, [IP-PBXs] are easier to customize, cheaper to maintain than older networks and simpler to operate"); *ZDNet Tech Update: Advantages of Network PBX* (maintenance costs of IP-PBX can be cut by as much as 5 to 70 percent compared to conventional PBX equipment).

[81] A traditional PBX system is proprietary, and "customers usually have to ask their vendor to add new applications and pay for the service." C. Wilde, *IP PBX Basics*, Informationweek.com (May 14, 2001). In contrast, with an IP-PBX, "a few clicks from a management console or a Web Browser gets the job done." *ZDNet Tech Update: Advantages of Network PBX*. *See also* Sphere, *IP PBX*, http://www.spherecom.com/solutions/ippbx.htm ("Setting up new users and tasks like moves/adds/changes get done with a point-and-click instead of physically moving wires and phones.").

[82] J. Thompson, *VoIP: The Quiet Revolution*, Boardwatch Magazine (June 2001).

[83] Communications Daily at 7 (Jan. 23, 2002) (quoting results of study by InfoTech, *IP LAN Telephony: Probing the Shift in Market Demand*); *see also* S. Sleeper, *Networking Giant Finds Its Voice*, Investor's Bus. Daily (May 29, 2001) ("Sage Research Inc. of Natick, Mass., found that 52% of firms surveyed plan to install at least a partial IP system by September vs. 16% in September 2000.").

[84] *See*, *e.g.*, J. Thompson, *VoIP: The Quiet Revolution*, Boardwatch Magazine at 50 (June 2001); *see also* B. Sullivan, *IP PBX: The Quiet Storm*, Communications Today (Feb. 14, 2001), http://www.findarticles.com/cf_0/m0BMD/29_7/70458948/print.jhtml (Avaya President and CEO Don Peterson: "IP is not a question anymore. IP will be the core").

[85] K. Mayer and D. Callahan, *This Old Enterprise*, Communications Solutions (Sept. 2001); *see also id.* (Frost & Sullivan "anticipates that IP-PBX desktops will account for more than half the total number of CPE stations shipped by 2006.").

[86] *See*, *e.g.*, *UNE Remand Order* ¶ 307 ("Competitive LECs and cable companies appear to be leading the incumbent LECs in their deployment of advanced services."); *id.* ¶ 308 (packet switches "are available on the open market at comparable prices to incumbents and requesting carriers alike. Incumbent LECs and their competitors are both in the early stages of packet switch deployment, and thus face relatively similar utilization rates of their packet switching capacity. . . . It therefore does not appear that incumbent LECs possess significant economies of scale in their packet switches compared to the requesting carriers.").

[87] *See NPRG CLEC Report 2000, 12th ed.*, Ch. 6 (competing carriers had 860 packet switches as of year-end 1998); *NPRG CLEC Report 2002, 15th ed.*, Ch. 4 at Table 18. As noted above (see note 6, *supra*), this figure is highly conservative.

[88] *NPRG CLEC Report 2002, 15th ed.*, Ch. 4 at Table 18.

Table 11. Average Number of CLEC Packet Switches in Top 100 MSAs			
MSA Rank	**1998**	**2001**	**Percent Increase**
1-25	7	16	125
26-50	4	10	158
51-75	2	7	246
76-100	1	2	60
Source: New Paradigm Resources Group. *See* Appendix M.			

The two main kinds of packet switches used today are Frame Relay and ATM switches.[89] One new packet-switching technology – Gigabit Ethernet – has recently been deployed, and is growing as an alternative to Frame Relay and ATM for very high-bandwidth applications.

The largest providers of both Frame Relay and ATM services are AT&T, WorldCom, and Sprint, which control more than two-thirds of the nationwide market for these services. *See* Figure 5.[90] While the precise numbers of Frame Relay and ATM switches these carriers operate are unavailable, it is clear that they all operate vast nationwide Frame Relay and ATM networks. *See* Appendix I.[91] As one analyst has noted, "[t]he Big 3 IXCs own the U.S. frame relay market, have scale economies and are best positioned to influence users and move the market."[92] Numerous other CLECs also provide ATM or Frame Relay service. *See* Appendix I.[93] And while the Bell companies compete in the provision of these packet switching services as well, they have been significantly hampered by the fact that they cannot provide interLATA packet-switching services, despite the fact that customers typically desire a single carrier to provide both intraLATA and interLATA packet switching.[94]

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[89] *See IDC Packet Switching Report* at 1 & Figure 2 (frame relay and ATM services account for 96.4 percent of the packet-switching market).

[90] *See IDC Packet Switching Report* at Figures 9, 31 (AT&T, WorldCom, and Sprint together accounted for 65.8 percent of revenues for ATM, and 68.4 percent of revenues for frame relay in 2000); *Stratecast ATM/Frame Relay Report* at 10 ("Tier 1 service providers continue to dominate the U.S. market, controlling over 70% of the market."); *id.* at 17 ("In 2000, AT&T held the largest share of ATM service revenues, with a 36% share of [the] market; WorldCom and Sprint held the second and third leading position in the market with shares of 26% and 22%, respectively. As in the frame relay market, the RBOCs collectively represent a small share of the ATM services market.").

[91] AT&T Corp., *AT&T ATM Service, Brochure*, http://www.ipservices.att.com/brochures/atm.pdf (AT&T's domestic Frame Relay and ATM network has over 620 Points of Presence (POP)); *IDC Packet Switching Report* at 137 (700+ POPs for WCOM); WorldCom, *US Products, Data Networking, Frame Relay*, http://www.worldcom.com/us/products/datanetworking/framerelay/index.phtml (402 Frame Relay POPs); Sprint Corp., *Sprint Business, Dedicated Access, Service and Support*, http://www.sprintbiz.com/small_business/dedicated_ip/ (320 POPs).

[92] *Stratecast ATM/Frame Relay Report* at 12.

[93] The FCC already has recognized in the past that "it is precisely in the provision of services like frame relay that competition is most intense, and we acknowledge the sensitivity of the LECs' position as they face increasing competition, especially regarding these services that are likely to be related to nonregulated and highly competitive services." *Policy and Rules Concerning Rates for Dominant Carriers*, Memorandum Opinion and Order, 8 FCC Rcd 7474, ¶ 63 (1993).

[94] As noted by industry analysts and CLECs alike, Bell companies are limited in their broadband offerings due to restrictions on the provision of interLATA services. *See*, *e.g.*, *Stratecast ATM/Frame Relay Report* at 12 ("Thus far, the RBOCs have held a very small share of the frame relay market, primarily because they have only been allowed to

The newest packet-switching technology being provided in metropolitan areas is Gigabit Ethernet.[95] Competitive carriers also lead in the deployment of Gigabit Ethernet switches.[96] As one analyst notes, "metro Ethernet services [are] being aggressively marketed by companies such as Yipes[,] Time Warner Telecom, XO, and Telseon."[97] These services are now available in central business districts of top tier markets, but also are being deployed more widely. Revenues for Gigabit Ethernet are still small – most estimates say under $100 million – but are expected to grow to as much as $4 billion by 2005.[98] A recent survey of corporate users found that, although less than one percent of enterprise networks are using Gigabit Ethernet as their primary LAN transport today, nearly one-quarter expect to deploy Gigabit Ethernet within two years.[99]

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offer intra-LATA services."); WorldCom, *Metro Frame Relay Service*, http://www.worldcom.com/us/products/datanetworking/framerelay/metro (WorldCom's Metro Frame Relay service "offers an aggressive price position compared to that offered by LECs. LECs can offer local (intraLATA) service, but they aren't able to cross LATA boundaries or move into other Regional Bell Operating Company (RBOC) territories. WorldCom is in the unique position to provide both interLATA (IXC) and intraLATA frame relay service by capitalizing on our wholly owned nationwide network.").

[95] *See Broadband 2001* at 124 (Gigabit Ethernet (GigE) "Internet access providers connect large enterprises, educational institutions, and small and medium enterprises in large office buildings (MTUs) to the Internet. . . . GigE players also offer LAN-LAN connectivity, also know as transparent LAN services (TLS), to medium and large enterprises. . . . GigE service providers offer wholesale MAN connectivity, providing the infrastructure for high-speed metro backbones."); Cisco, *Technology Brief: Introduction to Gigabit Ethernet*, http://www.cisco.com/warp/public/cc/techno/lnty/etty/ggetty/tech/gigbt_tc.htm (Gigabit Ethernet is typically offered at speeds of 1.25 Gbps).

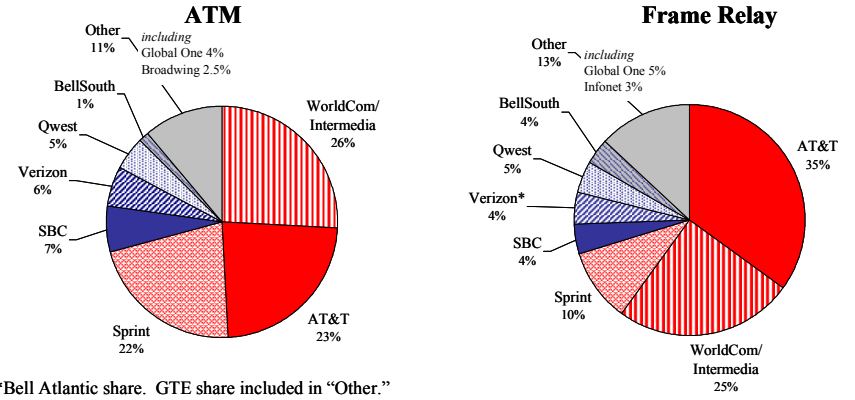
[96] *See*, *e.g.*, Yipes Communications, *Yipes Announces Nationwide Availability of Instantly Scalable Bandwidth* (Sept. 11, 2001) ("Yipes Communications, Inc. [is] the defining provider of optical Gigabit Ethernet networks"); Telseon Press Release, *Telseon Announces Service Promotion to Drive Metropolitan Gigabit Ethernet Service Adoption* (Apr. 24, 2001) ("As one of the GigE service leaders, Telseon is showing that speed and simplicity of deployment are possible in the metro optical network.") (quoting George Peabody, Aberdeen Group, Vice President and Practice Manager, Communications Infrastructure and Services).

[97] *Stratecast ATM/Frame Relay Report* at 17. *See also* S.M. Milunovich, Merrill Lynch Capital Markets, Investext Rpt. No. 2779422, Tech Strategy; All's Not Quiet on the GIGE Front – Industry Report at *1 (Apr. 10, 2001) (Yipes Communications "has built a 20-city, all-optical, all-GigE network in less than two years," which "offers at least a 5-to-1 cost advantage versus IP over ATM/SONET."); S. Clavenna, *Metro Optical Ethernet*, Lightreading.com (Nov. 13, 2000), http://www.lightreading.com/document.asp?doc_id=2472 (Cogent Communications "has built a network around the sole proposition of providing 100-Mbit/s Ethernet services to tenants of office buildings for $1000 per month, roughly the price of a traditional T1 (1.5 Mbit/s) line."); D. Allen, *Will Gigabit Ethernet WAN Services Make Us Forget About SONET?*, Network Magazine (July 5, 2001) (Telseon has more than 120 Gigabit Ethernet POPs in 20 cities).

[98] *See* L. Cooper & T. Moore, *Corporate America Implementing New Gigabit Ethernet Strategies; Industry Trend or Event*, Communications News (Aug. 1, 2001) (citing Infotech Consulting).

[99] *See id.*

Figure 5. Market Share of Nationwide ATM and Frame Relay Revenues



*Bell Atlantic share. GTE share included in "Other."

Source: R. Kaplan, IDC, *U.S. Packet/Cell-Based Services Market Forecast and Analysis, 2000-2005* at Figures 9 & 31 (2001).

Migration of Traffic to Packet-Switched Networks. Data traffic overtook voice traffic on the phone network in 1998. Since that time, the volume of data traffic has continued to grow much faster than voice.[100] CLECs in particular earn almost half of all their revenues from data services – some $27 billion is the projection for 2002.[101] Data services are the fastest growing source of CLEC revenue.[102] *See* Figure 6 & Table 12.

However it is used, whether for pure "data" (like a spreadsheet) or for data traffic (like messaging) that may in fact compete with voice, the packet switch provides an entry point for CLECs into the provision of switching services in direct competition against ILEC circuit switches. Packet switches compete against circuit switches for all traffic that would otherwise move through a dial-up circuit-switched connection, but that now is conveyed instead to a packet switch directly. And, of course, these packet switches in many cases either are or are capable of being used to provide voice services along with the more traditional data services.

Residential and business customers alike now use e-mail and instant messaging (IM) as direct substitutes for many voice calls.[103] A large and growing fraction of e-mail and IM traffic originates and/or terminates on competitive networks. And even when carried over ILEC networks, such traffic displaces significant usage-sensitive (*e.g.*, per-minute or per-call) revenues that otherwise would be earned.

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[100] *See*, *e.g.*, William E. Kennard, Chairman, FCC, The Telecom Act at Three: Seeing the Face of the Future, address at the Comptel 1999 Annual Meeting and Trade Exposition, Atlanta, GA (Feb. 8, 1999) ("last year, for the first time, data traffic eclipsed voice traffic on phone lines."); J. Linnehan, Thomas Weisel Partners, LLC, Investext Rpt No. 2295458, Company Report – Level 3 Communications at *3 (Sept. 15, 2000) ("Data traffic has surpassed voice traffic at a three to two ratio."); S. Wadhwani, Dain Rauscher Wessels, Investext Rpt No. 2150061, Avanex Corp. – Company Report at *3 (May 3, 2000) ("While voice traffic is growing at only 3%-5% annually, data traffic is estimated to be growing upward of 30%-50% annually.").

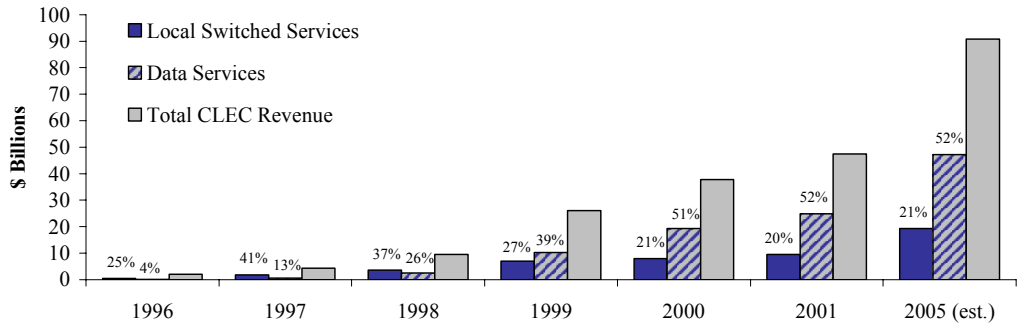
[101] *See NPRG CLEC Report 2002, 15th ed.*, Ch. 3 at Table 10.

[102] *See id.*, Ch. 3 at Table 10; Ch. 2 at Table 8; Ch. 3 at Table 9. This category includes "all data and data-related services (*e.g.*, frame relay, ATM, and Internet access)." *Id.*

[103] As the chairman of AOL's Internet division has stated, "People are not on the telephone anymore." *AOL Promises Open Instant Messenger*, ITworld.com (July 23, 2001), http://www.itworld.com/App/300/IDG010723openaol/.

There are now 900 million e-mail accounts in the U.S. and over 60 million IM users.[104] It is estimated that consumers in the U.S. are sending approximately 3.2 billion e-mail messages[105] and approximately 1 billion IM messages[106] *per day*. If only 10 percent of these 4.2 billion daily e-mail and instant messages substitute for a voice call (of 5 minutes average duration), that is equivalent to about 750 billion minutes per year, or roughly one-third of all local traffic that passes through ILEC networks.[107] And while estimates vary, consumer surveys find that the actual rate of voice substitution is considerably higher. *See* Table 13. E-mail and IM support voice services directly, too, particularly voice messaging services. Voice capabilities are already a standard feature of Instant Messaging.[108] Yahoo!, MSN and AOL all offer voice messaging services over their instant-messaging networks.[109]

Figure 6. CLEC Revenues



Source: New Paradigm Resources Group. *See* Appendix M.

[104] *See* D. Whelan, *The Instant Messaging Market*, American Demographics (Dec. 2001).

[105] *See* T. Shinkle, *Time for a New Look at Email Management*, Computer Technology Review at 48 (June 2001).

[106] *See* R. Gann, *Fast Talking Instant Messaging Software*, Internet Magazine at 140 (Jan. 1, 2001).

[107] *FCC Statistics of Common Carriers, 2000/2001 ed.* at Table 5.8 (Total 1999 Dial Equipment Minutes of 4.414 trillion divided by 2 yields 2.207 trillion conversation minutes; 750 billion/2.207 trillion = 33%).

[108] *See*, *e.g.*, S. Spanbauer, *Browsing & Beyond: We Pick 13 Must-Have Tools For Today's Internet, Including The Best In Browsers And Add-Ons, E-Mail, Instant Messaging, And Much More*, PC World (Feb. 1, 2002) ("Odigo is the only IM tool we looked at that doesn't let you do PC-to-PC voice chat."); *see also* C. Seper, *'Bots' Add Touch of Humanity, Artificial Intelligence Brings Real Business to Instant Messaging*, Plain Dealer (Dec. 31, 2001).

[109] *See* Yahoo!, *Yahoo! Pager Turns Up The Volume On Instant Messaging, New Voice Chat Feature Allows Users to Talk Live Over the Internet* (May 13, 1999); ICQ Press Release, *ICQ, Inc.and Net2Phone Sign Four-Year, Multi-Million Dollar Internet Telephony Agreement* (July 20, 1999); C. Crouch, *MSN Gives Messenger a Voice*, PC World.com (July 19, 2000); *New MSN Messenger 3.0 Is the Only IM Service to Offer Free Long Distance to the United States and Canada*, M2 Presswire (July 20, 2000); AOL Press Release, *AOL Announces Next Generation of AOL Instant Messenger – Version 4.0 – For Windows and Mac Users* (Apr. 10, 2000).

Table 12. Selected CLEC Data Service Offerings	
CLEC	**Data Offerings**
AT&T	*AT&T Local Frame Relay and ATM Services*: "provide ubiquitous, feature-rich networking options to fit your local (intraLATA) networking needs. . . ideal for companies whose primary business communications needs are heavily concentrated within one or several metropolitan areas (i.e. LATAs)."
Cablevision Lightpath	"Lightpath offers both high quality asynchronous transfer mode (ATM) and advanced frame relay data networks to support demanding high-speed data requirements."
Choice One	"Lucent's 7R/E Packet Solutions . . . will allow Choice One to create a multi-service packet network that integrates voice, video and data services all on a single converged packet network."
Global Crossing	*Frame Relay:* "Link multiple locations with a fast, reliable data transmission network." ATM: "Support multiple applications over a single connection — only ATM technology offers the Quality of Service (QoS) necessary to efficiently support voice, video, and data."
Time Warner Telecom	"National network is built on ATM technology [DS-3, fractional DS-3, DS-1 and fractional DS-1], with facility and equipment redundancies."
US LEC	"US LEC Frame Relay Service is the premier method of fast-packet data communications delivery service in the industry."
WorldCom	*Metro Frame Relay Service*: Available "to more than 350 metropolitan areas serviced by 402 points of presence (POPs) across the nation." "[O]ffers an aggressive price position compared to that offered by LECs. LECs can offer local (intraLATA) service, but they aren't able to cross LATA boundaries. . . . WorldCom is in the unique position to provide both interLATA and intraLATA frame relay service."
XO	"We also have been installing Asynchronous Transfer Mode (ATM) routers and switches in our local network, which will enable us to meet the demands of large, high volume customers."
Sources: See Appendix M.	

Table 13. Growth of E-mail and Instant Messaging
C 53 percent of consumers use e-mail daily and use it for an average of 29 minutes a day.
C IM, online chat, and mobile messaging are used for 15 minutes daily.
C 37 percent of email users have cut back on their landline calling.
C According to the Gartner Group, 60 percent of all real-time online communication – voice or text – will be driven through instant messaging technology.
C According to InsightResearch survey: "Forty-seven percent of consumers said they use instant messaging. And of those, 96 percent said they use IM at home and 20 percent use instant messaging at work. . . . Nearly half of all respondents, 49 percent, use instant messaging as a replacement for a telephone call while one third, 35 percent, use it in place of sending an e-mail."
C "American workers send and receive approximately 2.2 billion messages every day."
C In a study by Vault.com, 45 percent of respondents said e-mail has replaced phone calls.
C 73 percent of teenagers use the Internet. For one-fifth of them, instant messaging beats the telephone and e-mail as the primary channel for remote communication with friends.
Sources: See Appendix M.

It is now clear that packet-switched networks are capable of and are being used to provide voice service along with traditional data services.[110] Long-distance carriers have been

[110] Both AT&T and WorldCom, for example, have launched retail voice-over-IP (VoIP) services to business customers; this "marked the first instance of two major telecom companies visibly transitioning to all-data networking that supports voice services." M. Smetznnikov, *AT&T Bets on Voice-Over-IP*, Interactive Week (Feb. 5, 2001), http://www.zdnet.com/intweek/stories/news/0,4164,2681792,00.html .

migrating voice traffic to high-speed packet switches for several years.[111] Many CLECs have now begun to migrate their *local* voice traffic onto ATM and Frame Relay networks as well. *See* Table 14. All of the major packet switch manufacturers have developed voice capabilities for their packet switches.[112] Growth for packet-based voice equipment outpaced all other telecom gear in first half of 2001.[113] Analysts now agree that markets for both packet switches and voice-over-packet services will grow rapidly in the next few years.[114]

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[111] *See*, *e.g.*, A. Lindstrom, *Talkin' 'Bout Next-Generation Telcos* (Level 3 designed its entire long distance network around packet switches from the ground up); T.K. Horan, CIBC Oppenheimer, Investext Rpt. No. 2749262, Telecom Services: Daily Teletimes – Industry Report at *1 (Mar. 1, 1999) ("Frank Ianna, president of AT&T Corp.'s network unit announced that by the end of the year, AT&T plans to stop buying traditional voice switches (circuit switches) in its long-distance network. The company will instead buy predominantly ATM switches for its long-distance network, which will allow data and voice to be carried on the same network more effectively. We note that Sprint also announced that it would stop buying circuit switches after 1999."); Communications Daily (Apr. 14, 2000) (according to MCI Chief Technology Officer Fred Briggs, in April 2000, WorldCom announced that "[a]s part of converging voice and data services, [WorldCom] is planning to roll out this year soft switch or IP switch to handle Internet and voice services on IP backbone.").

[112] *See*, *e.g.*, C. Stix, Morgan Stanley, Dean Witter, Investext Report No. 8092537, Cisco Systems – Company Report at *3 (July 20, 2001) ("Today over half of Cisco's product lines are voice-enabled."); Lucent Technologies, *Circuit to Packet: Extending the Value of Class 4 and 5 Network Infrastructure in Metro/Edge Networks* at 1, 2 (May 2001), http://www.lucent.com/businesspartners/clp/stories/circuit-to-packet.pdf. ("The migration from circuit to packet is underway. . . . Voice traffic is beginning to move from circuit-switched networks to data networks, including the Internet.").

[113] Communications Daily at 4-5 (Aug. 28, 2001) (according to a Synergy Research Group report, "Voice over Internet protocol (VoIP) equipment totaled $784 million in first half – 40% increase in year . . . Sales of VoIP for service providers grew to $196 million (1.2 million ports) in 2nd quarter, up 81% in year").

[114] *See*, *e.g.*, *TIA Sees VoIP Nearly Doubling*, Telco Bus. Report (June 18, 2001) (The Telecommunications Industry Association has recently predicted that the voice-over-IP equipment market would nearly double this year to more than $3.3 billion); L. Cauley, *What's Ahead for . . . Phones; Internet Telephony Has Been Slow in Coming, But It's About to Get a Big Boost*, Wall St. J. at R9 (June 25, 2001) (According to Cahners In-Stat Group, carriers looking to offer voice-over-IP services spent about $1.127 billion worldwide in 2000. By 2003 that figure is expected to more than double to $2.607 billion, and again double by 2005 to about $5.855 billion."); E.R. Jackson, U.S. Bancorp Piper Jaffray Inc., Investext Rpt. No. 2442005, Sonus Networks Inc. – Company Report at *2 (Jan. 19, 2001) ("We estimate the market for next-generation voice infrastructure solutions during 2000 to reach more than $1.5 billion. The market is expected to reach well in excess of $5 billion by 2003); L.M. Harris, Josephthal, Investext Rpt. No. 2454183, Sonus Networks Inc.: Initiating Coverage – Company Report at *1 (Jan. 30, 2001) ("While the voice-over-packet switching market in 2000 was probably less than $100 million, we project that it will grow to $250 million in 2001, and to close to $6.5 billion dollars by 2005. At that point, voice-over-packet switching sales could account for 20% or more of total voice switching sales.").

Table 14. CLECs Using Packet Switches To Provide Voice Services	
CLEC	**Status of Voice-Over-Packet Deployment**
AT&T	"AT&T Corp . . . is offering voice over IP (VoIP) retail services for business, allowing the combination of voice, fax and data traffic on a single integrated IP connection managed by AT&T."
Choice One	"Lucent's 7R/E Packet Solutions, which will allow Choice One to create a multi-service packet network that integrates voice, video and data services all on a single converged packet network."
CTC	"CTC has delivered on its promise to having customers utilizing local and long distance voice services on our Cisco Powered packet-based VoIP network by the end of 2000, and its goal of being one of the first carriers to do so."
Global Crossing	"Global Crossing will complete the first phase of its U.S. VoIP network by the end of 2000, placing core VoIP gateway centers in a minimum of 15 additional cities"; "[t]he company plans to transfer its voice traffic from the circuit-switched network to the packet-based network by 2002."
Level 3	"Voice Termination from Level 3 is the first Internet Protocol-based voice product of comparable quality to the switched network because it requires no additional equipment or behavior changes on the part of your customers."
US LEC	Added high capacity ATM packet switches in all of its 23 existing switching centers in the U.S. as part of its "strategic plan to become an IP (Internet Protocol) based CLEC fully integrating voice and data services economically over high bandwidth networks."
WorldCom	"IP Communications" service "will enable businesses to move their voice traffic to an IP network and take advantage of a new generation of multimedia applications."
XO	"XO has begun the first phase of an expansive migration to packet-based switching technology, which is expected to deliver the full range of traditional and enhanced local and long distance services."
Sources: See Appendix M.	

Cable operators, who have been offering cable telephony on their own circuit switches for several years, are now migrating to packet-switched alternatives as well. The upgrades that allow cable companies to offer cable modem services also make it possible for cable to provide high-quality digital telephone service with only a small incremental investment.[115] Uniform industry standards for providing IP telephony over cable are now in place. The North American cable industry has developed and adopted the DOCSIS 1.1 standard.[116] Since the adoption of

[115] *See*, *e.g.*, *Broadband 2001* at 39 (IP telephony "requires no additional outside plant investment, draws heavily on the core data service infrastructure, and only requires modest incremental equipment investment."); J. Yoshida, *Modem Issues Put Cable Voice-Over-IP Service on Hold* ("cable VoIP service can share the same infrastructure already established for high-speed data services."); *NCTA Cable Telephony Report* at 5 ("VoIP is not only an incremental expense, it utilizes the data path the industry has already built, and should allow for easy software changes and additions to service packages, and innovative combinations of voice, data, and fax services."); *see also* G. Cooke, *Taking the Hybrid Road to IP Telephony*, CED (Dec. 2000), http://www.cedmagazine.com/ced/0012/12e.htm (a "new, hybrid cable IP telephony architecture has emerged. This new architecture enables cable operators with circuit-switched telephony equipment to begin offering converged IP services over their access network without having to forklift all of their existing circuit-switched equipment out of the network.").

[116] *See* Cable Datacom News, *Standards – Cable Modem Standards and Specifications*, http://cabledatacomnews.com/cmic/cmic3.html (The DOCSIS 1.1 specifications add key enhancements to the original standard, such as improved QoS and hardware-based packet-fragmentation capabilities to support IP telephony, and other constant-bit-rate services); CableLabs Press Release, *CableLabs® Certifies Two DOCSIS™ 1.1 Modems and Qualifies Two CMTS, Achieving Breakthrough on Advanced Devices* (Sept. 27, 2001) ("DOCSIS 1 enables cable operators to deliver twice the level of functionality while reducing operating costs by half."); J. Yoshida, *Modem Issues Put Cable Voice-Over-IP Service on Hold* (DOCSIS adds to the previous standard (DOCSIS 1.0, which was designed for cable modem service), "three key elements . . . to support toll-quality telephone calls: upstream packet fragmentation and reassembly techniques, support for a national clock, and an advanced isochronous scheduling system.").

DOCSIS 1.1, the widespread deployment of cable telephony has been awaiting "the availability of cable modems based on version 1.1 of the Data Over Cable Service Interface Specification. DOCSIS 1.1," which was first released in 1999.[117] CableLabs began its certification program for compliant products in 2000; CableLabs certified the first DOCSIS 1.1 compliant cable modems in September 2001.[118] Further tiers of certification are now nearing completion as well.[119]

Upgrading existing cable plant to provide IP telephony costs about $700 per line, or about 15 percent less than circuit-switched telephony.[120] IP telephony also has lower operating costs (by at least 5 percent) than circuit-switched telephony, owing largely to the fact that "it can share a single infrastructure with data."[121] Cable operators are currently conducting trials of IP telephony. *See* Table 15. According to analysts, widespread commercial deployment of IP cable telephony (at least as a secondary line service) will begin in late 2002 or early 2003.[122] Cable

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[117] J. Yoshida, *Modem Issues Put Cable Voice-Over-IP Service on Hold*.

[118] *See* J. Baumgartner, *MSOs Will Make Graceful Transition to DOCSIS 1.1*, CED (Jan. 1, 2002); D. Iler, *Road to PacketCable Passes DOCSIS 1.1*, Multichannel News (Nov. 26, 2001) ("The first domino in standards-based voice-over-Internet protocol (VoIP) gear hitting the market fell in late September when two cable modems and two cable-modem termination systems (CMTSs) won Data Over Cable Service Interface Specification (DOCSIS) 1.1 certification and qualification from Cable Television Laboratories Inc. . . . CableLabs certified cable modems from Toshiba America Information Systems Inc. and Texas Instruments Inc. – whose reference design was used in Toshiba's modem – and qualified CMTSs from Arris Group Inc. and Cadant Inc.").

[119] *See* J. Baumgartner, *MSOs Will Make Graceful Transition to DOCSIS 1.1*, CED (Jan. 1, 2002) ("a variety of cable operators are in the middle of evaluating CMTSs based on or upgradeable to DOCSIS 1.1."); R. Brown & J. Baumgartner, *After the Dust Settles; As Network Upgrades Approach Completion, Service Providers Aim to Launch New Services*, CED (Dec. 1, 2001) (Cox Communications Senior Vice President of Technology Development Chris Bowick: "Over the last six months or so, we've been deep into the evaluation of all the various next-generation CMTS vendors. We have selected two. . . . These are the devices that we will be deploying, or have been deploying for a while, and will continue to deploy through next year in anticipation of becoming fully 1.1-compliant. We'd like to push toward that, toward beginning to get 1.1 compliant through the end of next year."); D. Iler, *Road to PacketCable Passes DOCSIS 1.1*, Multichannel News (Nov. 26, 2001).

[120] *See*, *e.g.*, *JP Morgan Cable Industry Report* at 46; *see also* AT&T Broadband, *Investor Presentation* at 37 (July 2001) (AT&T estimates that providing primary line VoIP telephony would involve costs totaling $530-$620 per customer, including $230-$270 for switching and other outside equipment and $300-$350 for customer equipment, while circuit switched primary line telephony would cost $675); *JP Morgan Cable Industry Report* at 51 ("IP benefits from substantially lower costs in the centralized equipment that resides in the headend.").

[121] B. Michael, *Cable VoIP*, Computer Telephony at 36 (Aug. 1, 2000). *See also JP Morgan Cable Industry Report* at 46 ("IP's operating costs will probably run 5% less than those for circuit voice."); *id.* at 54 ("IP voice offers the promise of using a single hardware platform, support system, and staff for both data and telephony services," which "not only lowers capital and operating costs, but also simplifies operations and provisioning."); Nortel Networks, White Paper, *The Cable Telephony Opportunity; Increasing Profits With Integrated Telephony and Data Services*, http://www.gel.ulaval.ca/~mlecours/19504/Modem-cable/NortelCM.pdf. ("By delivering IP telephony and data services over a single DOCSIS cable modem system, headend and customer premise equipment expenditures are reduced. Additionally, operating efficiencies are gained by managing a single telecommunications platform, rather that multiple logical networks. The use of common equipment also simplifies customer provisioning and installation processes.").

[122] *See*, *e.g.*, R.A. Bilotti, Morgan Stanley, Dean Witter, Investext Rpt. No. 8202634, Cable: The Past Is Prologue to the Future – Industry Report at *5 (Oct. 5, 2001) ("We expect the cable operators to begin offering IP telephony in 2002/2003"); M. Paxton, *Cable Telephony – Moving Slowly But Surely*, CED (Jan. 2002), http://www.cedmagazine.com/ced/2002/0102/id6.htm ("most [MSOs awaiting IP telephony] remain confident that by late 2002/early 2003, cable telephony will be an important part of their service menu"); J. Baumgartner, *No Large VoIP Roll-Outs Until Late 2002*, CED at 10 (Jan. 1, 2002) ("[I]t's expected that cable operators won't rollout IP telephony in

operators are expected to deploy primary line IP cable telephony service shortly thereafter.[123] Analysts expect that there will be between five and seven million cable IP telephony subscribers by 2006.[124]

Table 15. Cable IP Telephony

Cable Operator	IP Telephony Trials	Plans For Future Deployment
Time Warner	Portland, ME Rochester, NY	As of March 2001, Time Warner planned to attract 1,000 IP voice customers by September 2001, and to then monitor usage and calling patterns before embarking on a full deployment. IP telephony "will be offered some time [in 2002] in the [Tampa] bay area and central Florida."
AT&T Broadband	Boulder, CO	"We're looking to deliver IP as quickly as possible." (Jim Wood, vice president of advanced technology, Sept. 2001)
Cox	planned	"Our strategy is to launch circuit-switched technology in our markets, and we've done that. . . . IP telephony is nearly ready for prime time. We're watching it very closely." (Tom White, Director of Marketing, Apr. 2001) "Cox is confident that IP telephony will add great value for our customers . . . We envision circuit switched and IP services will coexist in all of our networks." (Jim Robbins, CEO, May 2001)
Comcast	Alexandria, VA Union, NJ (completed) Philadelphia, PA	Customers could see IP telephony service in 2002. (Steve Craddock, senior VP of new media, Apr. 2001)
Adelphia	Buffalo, NY	As of June 2000, Adelphia expects to launch commercial service first in Buffalo. Other markets will include Pittsburgh and its suburbs, Florida, Colorado Springs, Southern California, and other areas served such as Vermont, Virginia and Ohio.
Cablevision	Long Island, NY	Cablevision's digital and interactive television service, iO, is currently available to 550,000 homes in Long Island; the company plans to roll out iO throughout its service area, passing 4.7 million homes. The iO digital box will enable the provision of IP telephony to residential subscribers. Cablevision is currently testing this service in 300 homes and intends to begin commercial deployment in 2002.
Charter	Wausau, WI St. Louis, MO	Charter plans to begin IP-telephony tests in 2002. Charter has already conducted two technical VoIP trials; the company will launch a marketing trial of both primary and secondary line IP service in Stevens Point, Wisc.

Sources: See Appendix M.

earnest until the latter part of 2002. Until then, we'll probably see more lab trials and pilot efforts in the field to make certain that everything works as advertised and that it's a service with consumer demand"); A.B. Green, Lehman Bros. Inc., Investext Rpt No. 8302989, Broadband Access Technologies at *3 (Dec. 14, 2001) ("Our sense from the cable show is that operator interest and deployments of cable telephony are a likely story for the second half of 2002."); J. Duffy, *DOCSIS Compliance Delaying Cable IP Telephony*, Network World (Aug. 13, 2001) ("It will be late 2002 or early 2003 before widespread deployments of IP-based cable telephony occur, the research firm [Cahners In-Stat Group] predicts.").

[123] *See*, *e.g.*, *JP Morgan Cable Industry Report* at 46 ("we suspect that most MSOs will deploy primary-line IP voice in 2004 or 2005"); *Strategis Group U.S. IP Cable Telephony Report* at 52-53 (predicting that AT&T, Cox, Adelphia, Comcast, and Charter will begin deploying primary line IP telephony in late 2003/early 2004).

[124] *See id.* at Table 3.9 (predicting 7.36 million IP telephony lines by 2006); *Forrester Sizing US Consumer Telecom Report* at 10-12 ("[B]y 2006, [cable companies] will reap the rewards of conversion to IP – an increased set of offerings at lowered costs – in the form of 4.8 million new packet lines.").

There are strong incentives for CLECs and cable operators to migrate to packet switching.[125] Packet switches serve the most dynamic, rapidly growing sector of the industry – the data sector. They are much more compact than circuit switches,[126] and they are much cheaper to purchase and deploy.[127]

A new generation of "softswitch" packet switches is now accelerating all of these trends.[128] They are fast enough to switch voice, data, video, and other forms of traffic; they are thus far more compact and efficient than the arrays of media-specific hardware that they can displace. Equipment manufacturers, CLECs, and industry analysts all agree that these new switches can serve as complete "replacements" for Class 5 switches. *See* Appendix J, Tables 1 & 2. Numerous CLECs have already deployed softswitches. *See* Appendix J, Table 3. The Yankee Group expects worldwide sales of softswitches to rise from $16 million in 1999 to $824 million in 2003.[129] Frost and Sullivan predicts that "providers will invest more than $39 billion in softswitch technology by 2006 and will realize $85 billion for services delivered using the technology that year."[130]

C. Wireless Switches as Substitutes for Circuit Switches.

Wireless switches substitute for wireline switches at the margin, in much the same way as packet switches do. The marginal buyer of wireline service is the residential buyer of second-

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[125] *See*, *e.g.*, A. Lindstrom, *Talkin' 'Bout Next-Generation Telcos* ("New business models based on the use of IP-oriented switches . . . enable gross margins in the 60 percent-plus range and the ability to provide differentiated offerings."); J. Boyd, *The End of the Central Office*, http://www.internetwk.com/infastructure/infra081400-3.htm (Aug. 14, 2000) ("The huge price differences between Class 5 switches and new convergent platforms will allow more start-up CLECs like ACD.net to enter the market.") (citing Andrew Clay, analyst, Aberdeen Group).

[126] *See*, *e.g.*, E.R. Jackson, U.S. Bancorp Piper Jaffray Inc., Investext Rpt. No. 2267558, Sonus Networks Inc.: Initiating Coverage – Company Report at *4 (Aug. 21, 2000) (packet switches "can result in a reduction of up to 90% in equipment space requirements.").

[127] *See*, *e.g.*, *id.* ("packet telephony offers potential reductions of up to 50% in switch per-port costs" compared to traditional circuit switches." This "[f]aster, cheaper, smaller, and more versatile switching equipment is transforming the central office."); Wall St. Transcript Corp., Investext Rpt. No. 2003080, Analyst Interview: Telecommunications – Industry Report at *3-*4 (Sept. 22, 2000) (Trent Spiridellis, Principal and Senior Equity Research Analyst, Banc of America Securities: the price performance of an IP network "doubles . . . every 20 months.").

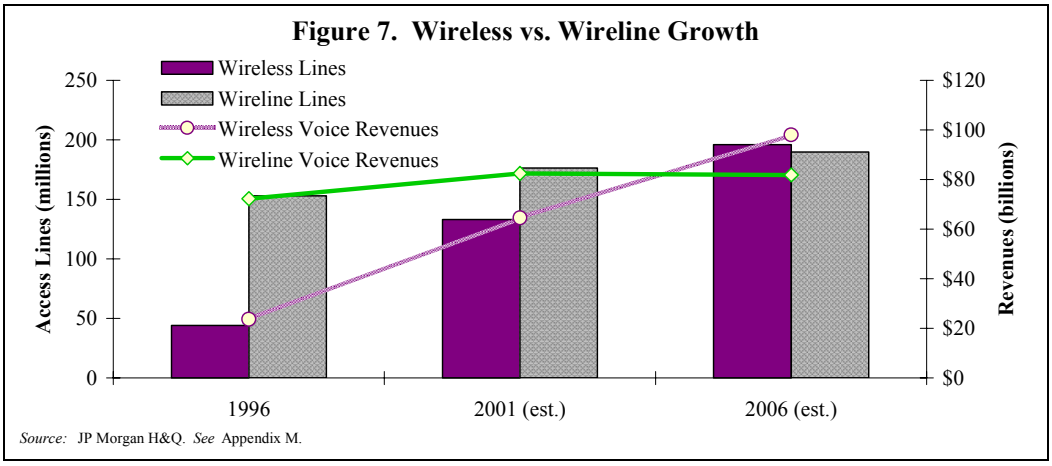
[128] *See*, *e.g.*, M. Reddig, *Top 10 Advances in Switching* ("The most important development in switching over the past 3 years has been the rapid development, innovation and standardization of softswitches.") (quoting Constantine Gavrilidis, Broadriver Communications."); *id.* ("Three years ago, softswitches were just a concept. Today they are an integral part of an important milestone in the history of telecommunications."); M. Johnston & D. Pappalardo, *WorldCom Sees Promise in Move to Softswitches*, Network World (Jan. 29, 2001) (As WorldCom's Chief Technology Officer has noted, softswitches are "not pie in the sky," but rather "stuff that we are deploying *today*.").

[129] *See* P. Korzeniowski, *Pieces of Concern – The Communications Market Is One Big Puzzle, and Clecs Are Scrambling To Find the Right Fit*, tele.com (May 29, 2000) (citing Yankee Group).

[130] M. Reddig, *Softswitches Emerge from the Shadows* (citing Frost & Sullivan, World Softswitch Markets). *See also id.* (citing estimate by The Pelorus Group, *Softswitches and Broadband Switching: The New Environment* that "the softswitch market will grow from a revenue base of $200 million in 2000 to roughly $4 billion by 2004.").

line service. And as "margins" go, this is a big one: approximately 26 percent of U.S. residential customers buy second-line service from a wireline phone company.[131]

As of February 2002, there were an estimated 130 million wireless subscribers in the United States – up from 34 million at the end of 1995[132] – as compared to the approximately 190 million users of switched landline telephone service.[133] Two in five Americans – with all adults and children included in that count – have a mobile phone.[134] Some twenty million new subscribers are being added annually.[135] Wireless carriers are adding subscribers much faster than their wireline counterparts – in percentage terms, and in absolute terms, too.[136] *See* Figure 7.



All of this wireless traffic is *switched* traffic. Wireless carriers other than those affiliated with Bell companies have deployed a total of more than 950 circuit switches nationwide. *See* Appendix F.[137] Many of the switches that wireless carriers are using are indeed the same switch types that CLECs are using – for example, the Lucent 5ESS, Nortel DMS 100, and Ericsson AXE-10.[138]

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[131] *See Forrester Sizing US Consumer Telecom Report* at 2.

[132] *See CTIA's Semi-Annual Wireless Industry Survey Results*; CTIA, *CTIA's World of Wireless Communications*, http://www.wow-com.com (131 million current U.S. wireless subscribers as of Feb. 12, 2002).

[133] *See CSFB 3Q01 CLEC Vital Signs Review* at Exh. 9; *see also FCC Local Competition Report, Feb. 2002 ed.* at 1.

[134] *See* Michael Powell, Chairman, FCC, *Consumer Policy in Competitive Markets*, remarks before the Federal Communications Bar Association, Washington, D.C. (June 21, 2001).

[135] *See CTIA's Semi-Annual Wireless Industry Survey Results*.

[136] *Compare FCC Statistics of Common Carriers, 2000/2001 ed.* at Table 4.10 (total switched access lines and residential switched access line growth, 1995-2000) *with CTIA's Semi-Annual Wireless Industry Survey Results* (estimated wireless subscribers, 1995-2000).

[137] These figures are conservative, because they are drawn from public sources or from the necessarily limited data available to the BOCs.

[138] *See, e.g.*, Lucent Technologies, *Switching Solutions, Switching, 5ESS Switch*, http://www.lucent.com/products/solution/O,,CTID+2002-STID+10055-SOID+935-LOCL+1,00.html ("The 5ESS® switch can deploy all

At the end of 2001, wireless calls already accounted for an estimated 12 percent of all U.S. phone calls.[139] There were approximately 200 billion billable minutes of wireless use in the first half of 2001, up 77 percent from June 2000, and up 34 percent from December 2000.[140] Wireless networks now switch at least one-quarter of the amount of traffic as wireline networks.[141] And wireless minutes of traffic are growing at over 60 percent per year, while landline minutes are growing at "low single digits."[142]

A second very large margin for which wireless switches compete is switched access traffic. In addition to completing local calls, local switches serve the second function of providing switched access to long-distance networks. Local access revenues represent approximately 14 percent of all local service revenues;[143] long-distance calling minutes (*i.e.*, access minutes) represent about one-quarter of all switched minutes on local plant.[144] Wireless plant certainly competes directly against wireline plant here, too.

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types and combinations of services from a single platform including wireline, wireless, voice and data."); Nortel Networks, *Products, Services & Solutions, DMS Switching Portfolio, DMS-100 Wireless Switching System*, http://www.nortelnetworks.com/products/01/dms100w/index.html (The DMS-100 "offers a flexible and cost effective way for a service provider to establish a single point of presence in both traditional wireline and wireless markets, as well as new data and internet telephony markets."); Alcatel, *Products and Services, Alcatel 1000 Multimedia Multiservice Exchange*, http://www6.alcatel.com/products/ (The Alcatel 1000 MM "handles any combination of fixed and mobile application.").

[139] *See* V. Bajaj, *Daytime Calling Clogs Spur Wireless Companies to Expand Night Minutes*, Dallas Morning News (Dec. 13, 2001) (citing David Bornowski, AT&T Wireless Services Inc.'s vice president/general manager for Texas and Louisiana). This number is projected to increase to nearly 50 percent by 2005. *See The Bull Market Report Daily*, www.bull-market.com (Jan. 12, 2001), http://www.bull-market.com/daily/Jan01/011201.htm. In terms of talk minutes, wireless is projected to account for over 40 percent of all conversation minutes by 2005. J. Sarles, *Wireless Users Hanging Up on Landline Phones*, S.F. Bus. Times (Mar. 23, 2001).

[140] *See* R. Whickham, *Don't Kid Yourself*, Wireless Review (Dec. 1, 2001), http://industryclick.com/magazinearticle.asp?releaseid=9715&magazinearticleid=136835&siteid=3&magazineid=9; *see also* CTIA, *Telephia Study Finds Outstanding Wireless Network Performance While Industry Experiences Rapid Growth*, http://www.wow-com.com/articles.cfm?ID=553 ("Minutes of use increased by 75% last year - from 147 billion minutes used in 1999 to 259 billion minutes used in 2000.").

[141] Wireline networks switch approximately 4.4 trillion local dial equipment minutes ("DEMs") per year, and there are two DEMs counted for each conversation minute, resulting in approximately 2.2 trillion originating and terminating minutes. There are 130 million wireless subscribers and the average subscriber uses 339 minutes per month (4,068 per year) on her wireless phone, resulting in approximately 529 billion originating and terminating wireless minutes per year. Both totals include toll minutes. *See* L.F. Carvalho, Morgan Stanley, Dean Witter, Investext Rpt. No. 8285600, Wireless Services: Industry Outlook: Life After 50 – Industry Report at *5 (Nov. 28, 2001) (average of 339 monthly MOUs per wireless subscriber in 2001); CTIA, *CTIA's World of Wireless Communication*, http://www.wow-com.com (130 million wireless subscribers); *FCC Statistics of Common Carriers, 2000/2001 ed.* at Table 5.8 (4.4 trillion Dial Equipment Minutes; "two [dial equipment minutes] are counted for every conversation minute").

[142] *See 3g Rollouts Inch Along, But Kagan Research Indicates Wireless Minutes Roaring Ahead, Set to Dominate Telecom Landscape by 2005 Leading Executives to Debate Market Demand, Technology and Financing at Kagan's Wireless Telecom Summit May 2-3 in New York*, Bus. Wire (Apr. 27, 2001).

[143] *See FCC Telecommunications Industry Revenues, 2002 ed.* at Table 2.

[144] *See FCC Statistics of Common Carriers, 2000/2001 ed.* at Table 5.8 (3.4 trillion local dial equipment minutes, both originating and terminating); *id.* at Table 2.5 (790 billion interLATA billed access minutes, both originating and terminating).

At least twenty million wireless customers (and counting) have plans that do not charge extra for long-distance.[145] The average price of a wireless long distance call is comparable to the average price of a long distance call made via wireline.[146] Many wireless carriers heavily market the "free long-distance" aspects of their service. Analysts report that "[t]he bundling of long distance calling at price points that are perceived as 'nearly free' to consumers is already making wireless long distance calling a more cost-effective alternative to wireline long distance calling to many wireless consumers."[147] Thus, "wireless continues to take share from wireline local and long distance usage."[148] AT&T recently noted that its wireline long-distance minutes of use were down about 10 percent, while its wholesale wireless long-distance traffic was running up about 35 percent.[149]

While wireless-wireline competition starts at the margin, it by no means ends there. Wireless is increasingly competitive with core primary-line wireline services. When the comparison is made between equivalent bundles of service, it is clear that wireless services are now price-competitive with wireline. Almost all wireline CLECs focus on selling bundles of service – not just basic access, but bundled long-distance and additional features as well.[150] And so do almost all wireless carriers. And so do most of the ILECs themselves. Regulation does require ILECs to offer unadorned, basic, local service at a very low price to all residential customers. But the vast majority of wireline customers buy much more – long-distance service, to begin with, which generates additional local-carrier revenues by way of access charges. And often, as well, other value-added features like call waiting, voice mail, and caller ID. A November 2001 Gartner Dataquest study concludes that wireless calling prices are already "competitive with, and in some case better than, wireline calling rates."[151]

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[145] *Sixth CMRS Report* at 32-33. The Strategis Group estimates that this number will grow to 90 million in 2005. *See* A. Backover, *AT&T Loss Reflects Long-Distance Shift Consumers Turn to Calling Cards, Wireless*, USA Today at 3B (Jan. 30, 2001).

[146] For example, Cricket offers long distance service at 8 cents per minute without monthly service charges or minimum usage charges. *See* Cricket, *Denver and Northern Colorado*, http://www.cricketcommunications.com/Denver_Colorado_2.asp; *see also* M. Rollins, Salomon Smith Barney, Investext Rpt. No. 2421667, Wireless by the Minute: Reviewing the Wireless Economic Model – Industry Report at *4 (Jan. 3, 2001) ("With buckets of minutes, wireless customers have a marginal cost of zero relative to wireline, which generally has a marginal cost of $0.05-$0.15 per minute.").

[147] *IDC Wireless Displacement Report* at 20. *See also* L.R. Mutschler, Merrill Lynch Capital Markets, Investext Rpt. No. 8247725, Sprint PCS Group – Company Report at *4 (Oct. 31, 2001) ("[T]he free long distance option in the Sprint PCS plan should make them attractive to subscribers that are interested in replacing wireline long distance minutes with wireless minutes.").

[148] M. Rollins, Salomon Smith Barney, Investext Rpt No. 8223022, Sprint PCS Group – Company Report at *4 (Oct. 18, 2001).

[149] *See* A. Quinton, Merrill Lynch Capital Markets, Investext Rpt No. 8232517, AT&T Corp. – Company Report at *5 (Oct. 24, 2001).

[150] *See*, *e.g.*, G.P. Miller, *et al.*, Jefferies & Co., Investext Rpt. No. 2918156, Telecom Services Weekly Update – Industry Report at *11 (Aug. 9, 1999) ("The CLECs have [] built much of their platform on offering competitively priced bundled and personalized service.").

[151] *Gartner U.S. Consumer Telecommunications and Online Market Report* at 33.

Wireless prices continue to decline rapidly – by as much as 10 to 20 percent a year in recent years.[152] While the length of the average wireless user's local call has increased, the average local monthly wireless bill has fallen from $97 in 1987 to $45 in 2001.[153] Analyst IDC attributes the dramatic growth in wireless usage, particularly in home and business locations that provide wireline access too, primarily to the fact "that wireless service pricing is rapidly approaching wireline service pricing."[154] At prices now in effect, wireless "is viewed as a cost-effective and compelling alternative to wireline."[155] Numerous analysts have reached the same conclusion.[156]

The Commission itself has agreed with this assessment in its July 2001 *Sixth CMRS Report*. It found that the wireless phone has "become a mass-market consumer device," that most wireless customers use their phones "primarily for personal calls," and that three in ten wireless users would prefer to give up their landline phone, if forced to choose, and that number rises to almost one in two among younger users.[157] The Commission's Report went on to discuss wireless services that are specifically being marketed as alternatives to wireline service.[158] Citing a Yankee Group survey, the report also found that at a quite sizable number of consumers – about 3 percent of wireless subscribers – have now abandoned wireline – in favor of wireless – entirely, "rely[ing] on their wireless phone as their only phone."[159] A more recent *USA Today*/CNN/Gallup poll found that 18 percent of cell phone users "use cell phones as their primary phones."[160]

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[152] *See*, *e.g.*, *Sixth CMRS Report* at 6.

[153] *CTIA's Semi-Annual Wireless Industry Survey Results*.

[154] *IDC Wireless Displacement Report* at 11.

[155] *Id.* at 19.

[156] *See*, *e.g.*, *Gartner U.S. Consumer Telecommunications and Online Market Report* at 41 (Gartner Dataquest: "Average mobile per-minute pricing will continue to decrease," with an "increased cross-elastic impact on wireline services."); *see also* Argus Research Company and Folio*fn*, *Sector Outlook: Telecomms Second Quarter 2001* (Second Quarter 2001), http://www.foliofn.com/content/forum/research/01Q2Telecom.pdf (Argus Research: "Pricing for wireless service has fallen to levels comparable with wireline service in many areas of the country, and more and more consumers are opting for wireless as their primary telecom connection."); J. Moran, *Phones: Cheaper and Better*, Hartford Courant at L28 (Feb. 25, 2001) ("The cost of wireless voice will continue to decline," [Peter Firstbrook, META Group research analyst] said. "You'll finally have competition for the [local phone companies]. I think we're at the transition right now where wireless prices are reaching parity with wireline.").

[157] *Sixth CMRS Report* at 32.

[158] *See id.* at 33-34.

[159] *Id.* at 32 (citing J. Sarles, *Wireless Users Hanging Up on Landline Phones*, Nashville Bus. J. (Feb. 2, 2001)). The Commission noted that CTIA estimated that this number "could be as high as 5 percent." *Sixth CMRS Report* at 32 n.207 (citing *Consumers Replacing Landline Phones with Wireless*, Knight Ridder/Trib. Bus. News (Jan. 10, 2001).

[160] M. Kessler, *18% See Cell Phones as Their Main Phones*, USA Today (Jan. 31, 2002).

III. INTEROFFICE TRANSPORT

The interoffice transport UNE comprises links between ILECs' and requesting carriers' wire centers or switches, and between ILEC switches.[1] A "wire center" is an end office where local loops terminate at an ILEC switch.[2] Interoffice transport does not include transport between an ILEC or CLEC switch and a customer.

The provision of interoffice transport is now highly competitive. The first competitors entered urban markets in 1985, and they have been laying competitive fiber optic networks ever since. The Commission first directed ILECs to provide collocation to competitive access providers in 1992.[3] Today, competitors have established fiber connections in a large fraction of BOC wire centers, which serve a significant percentage of BOC access lines. Many of the competitive transport facilities that CLECs have deployed are used to provide special access services; competitors now earn between 28 and 39 percent of all special access revenues.

As detailed below, it clearly is economical for competitors to serve an even larger number of wire centers with their networks than they currently do. With each additional mile of competitive fiber that gets deployed, the marginal cost of extending the network to reach an additional wire center gets lower. And the rise of the Internet has made it all the more attractive for CLECs to extend their fiber networks to ILEC end offices. Data connections generate a lot more traffic than voice calls do; the total volume of data traffic overtook voice traffic in 1998.[4]

A. Fiber-Based Collocation.

CLECs that provide competitive transport typically do so by collocating their own transmission equipment in an ILEC central office and connecting that equipment to their own fiber-optic network. This "fiber-based collocation" supplies the simplest and most unambiguous indicator of the extent of competition in the transport market, albeit a very conservative one that sharply underestimates the full extent of competition.

With few exceptions, competitively supplied transport begins in a CLEC collocation cage.[5] At the time of the last UNE review, the data required to determine where CLECs had

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[1] *See* 47 C.F.R. § 51.319(d)(1)(i) (defining dedicated transport as "transmission facilities . . . between wire centers owned by incumbent LECs or requesting telecommunications carriers, or between switches owned by incumbent LECs or requesting telecommunications carriers."); *id.* § 51.319(d)(1)(iii) (defining shared transport as "transmission facilities . . . between end office switches, between end office switches and tandem switches, and between tandem switches, in the incumbent LEC network.").

[2] *See Newton's Telecom Dictionary* 995 (16th ed. 2000). Wire centers vary widely in size, from fewer than 500 lines in rural areas, to over 300,000 in the most densely populated urban areas.

[3] *See Expanded Interconnection with Local Telephone Company Facilities*, Report and Order and Notice of Proposed Rulemaking, 7 FCC Rcd 7369 (1992).

[4] *See* Section II, note 100.

[5] *See*, *e.g.*, W.T. Scott, *et al.*, ING Baring Furman Selz LLC, Investext Rpt. No. 2787890, *Telecommunications/Fiber Vs. Fiberless* (Sept. 30, 1998) (quoting then-WinStar CEO, Bill Rouhana: "The fundamental underpinning of the strategy of most fiber-based companies in the industry today is that we will build to a central office, and we will co-locate with a regional bell operating company."); *id*. (quoting Allegiance Telecom CEO

obtained *fiber-based* collocation was not available.[6] It is today. The Commission's August 1999 *Pricing Flexibility Order* makes the presence of fiber-based collocation the trigger for pricing relief for special access services, and ILECs have therefore begun to compile such data systematically.[7]

As shown in Table 1, fiber-based collocation is now widespread. As of year-end 2001, *one or more* CLECs had obtained fiber-based collocation in 13 percent of the wire centers served by the Bell companies, which contain 54 percent of the business lines and 44 percent of all access lines served by the Bell companies. *See* Table 1. There also are multiple CLECs with fiber-based collocation in a large number of BOC wire centers, which contain a significant share of BOC access lines. *See id*.

Table 1. Competitive Interoffice Transport by Region

	Percentage of Wire Centers and Access Lines Served by:											
	1 or more fiber-based CLEC collocation nodes			2 or more			3 or more			4 or more		
	% Bus. Lines	% Total Lines	% WC	% Bus. Lines	% Total Lines	% WC	% Bus. Lines	% Total Lines	% WC	% Bus. Lines	% Total Lines	% WC
Verizon	55	44	12	37	25	5	28	17	3	17	10	2
SBC	50	41	13	35	25	7	23	15	4	15	9	2
BellSouth	62	53	19	52	43	13	43	34	9	34	26	6
Qwest	56	45	13	40	28	7	27	18	4	19	12	3
Total	**54**	**44**	**13**	**38**	**28**	**7**	**28**	**19**	**4**	**19**	**12**	**3**

In large metropolitan areas the totals are even higher. For example, in the 25 largest MSAs served by each BOC, an average of *one or more* CLECs had obtained fiber-based collocation in 35 percent of the wire centers served by the Bell company in those MSAs (containing 61 percent of all access lines within those MSAs). *See* Table 2. And, again, there

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Royce Holland: "We enter the market and put in switches, routers, both central office and frame-relay switches. We co-locate in a huge number of COs. We've targeted over 500 central offices to be in within the next few years. It represents a huge addressable market and then we go out and lease capacity initially, and as we reach the crossover point in terms of traffic, we either lease dark fiber or overbuild it. For instance, in New York, the crossover point is 40,000 lines. We have already moved to stage two, in which we acquired dark fiber from Metromedia Fiber Network."); KMC Telecom Holdings Inc., Form 10-K (SEC filed Apr. 17, 2001) ("[i]n all of our operational markets, we have completed our backbone construction connecting the market's central business district with outlying office parks, large institutions, the locations of long distance carriers' transmission equipment and major incumbent local exchange carrier central offices."); Adelphia Business Solutions, Form 10-K (SEC filed Apr. 2, 2001) (Adelphia claims that "[t]he broad deployment of fiber optic cable in Adelphia Business Solutions' markets typically enables connectivity among the Company, the ILEC central offices and the Company's customers."); Network Plus, Form 10-K at 13 (SEC filed Mar. 30, 2000) (Network Plus's fiber provides connections for the company's "co-location footprint.").

[6] As one analyst report notes, "detailed information on actual fiber deployment on an industry wide basis is not available." *Broadband 2001* at 92. To analyze competitive fiber, it is therefore necessary to "build a ground-up view of where such fiber is or is likely to be deployed." *Id.*

[7] *See Pricing Flexibility Order* ¶¶ 81-86, 147-152.

are multiple CLECs with fiber-based collocation in a large number of BOC wire centers in the largest MSAs, which contain a significant percentage of BOC access lines. *See id.*

Table 2. Competitive Interoffice Transport in the 25 Largest MSAs Served by Each BOC

	Percentage of Wire Centers and Access Lines Served by:							
	1 or more fiber-based CLEC collocation nodes		2 or more		3 or more		4 or more	
	% Lines	% WCs	% Lines	% WCs	% Lines	% WCs	% Lines	% WCs
Verizon	58	35	36	16	25	10	16	6
SBC	61	35	37	18	23	10	13	5
BellSouth	69	37	57	27	47	20	35	14
Qwest	60	32	38	19	25	11	18	7
Total	**61**	**35**	**40**	**19**	**27**	**12**	**18**	**7**

It is clearly economical for competitors to deploy fiber in an even larger share of wire centers than they currently serve. Some 30 percent of all wire centers contain 5,000 or more business lines, and those wire centers contain 84 percent of all business lines.[8] In those quantities, independent analysts have found that voice lines readily generate traffic in volumes sufficient to justify competitive fiber-optic transport.[9] And the actual experience of CLECs in the marketplace bears this out.

As shown in Table 3, one or more CLECs has obtained fiber-based collocation in nearly half of BOC wire centers with 5,000 or more business lines. *See* Table 3. And in wire centers with larger numbers of business lines, it is even more likely that at least one CLEC has obtained fiber-based collocation in that wire center. *See id.*

Table 3. Competitive Interoffice Transport in Large Wire Centers

	Percentage of all wire centers with *X* or more business lines that contain *Y* or more CLECs with fiber-based collocation:															
***X*=**	**5,000**				**10,000**				**20,000**				**30,000**			
***Y*=**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Verizon	51	26	16	9	66	39	27	15	78	65	50	31	93	84	69	41
SBC	38	21	11	6	51	32	18	10	73	53	41	19	80	64	45	28
BellSouth	66	51	37	25	81	75	62	47	91	91	86	75	100	100	100	100
Qwest	48	28	16	11	65	41	24	17	86	68	48	33	94	76	64	42
Total	**48**	**28**	**17**	**10**	**61**	**41**	**27**	**17**	**78**	**62**	**49**	**30**	**87**	**74**	**58**	**39**

[8] *See Broadband 2001* at 96.

[9] *See*, *e.g.*, *Broadband 2001* at 95 (Central offices "with more than 5,000 business lines . . . require [CLECs to gain] no more than 8% share [to break even] and therefore are well within the 'sweet spot' of even multiple CLECs per CO."); *see also id.* ("As might be expected, it is apparent that businesses residing with larger central offices spend up to one-third more on average per business per month than those businesses in smaller central offices.").

A fiber-based collocation test for the availability of competitive transport certainly provides a reliable indicator of which ILEC wire centers are served by competing fiber networks. It is worth emphasizing, however, that this test takes no account of the considerable amount of traffic that now bypasses ILEC wire centers completely. As one appellate court has noted, the fiber-based collocation metric "fails to account for the presence of competitors that . . . have wholly bypassed incumbent LEC facilities."[10]

This is all the more true because the ILEC wire center is no longer the only – or even the principal – point of traffic concentration. So if it is economical for a CLEC to run competitive fiber to reach an ILEC wire center, it is often economical to extend the fiber, directly to datacom hotels, large business customers, data ISPs, wireless carriers, cable headends, and countless other points of traffic concentration.[11]

Many private customers also now generate sufficient quantities of traffic to justify their own fiber optic connections. As discussed in Section IV.A, there are now direct CLEC fiber connections to tens of thousands of buildings in the U.S. – buildings that house a substantial fraction of all business customers.

CLEC networks also converge today at many other points of high traffic concentration, including interexchange carrier POPs and Network Access Points (NAPs). "Collocation hotels" – like those operated by Switch & Data, Cable & Wireless (formerly Exodus Communications), Global Switch, and Metro Nexus – create additional points of traffic concentration. These centers provide large (typically 10,000-50,000 square foot), high-security facilities to house servers, data storage equipment, and the network interface equipment used by telecom carriers and ISPs.[12] They give multiple CLECs and IXCs points at which to station their equipment and interconnect their networks.[13] Many of them are located right on the doorstep of existing ILEC wire centers.[14] In terms of how much traffic they originate and terminate, these facilities are as large as – and often much larger than – ILEC wire centers.[15] Data traffic at these centers is now

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[10] *WorldCom v. FCC*, 238 F.3d. 440, 462 (D.C. Cir. 2001) (quoting *Pricing Flexibility Order* ¶ 95). This framework also is conservative because it examines only fiber-based collocation, even though competitive carriers have obtained thousands of collocation arrangements that, although not fiber based today, could easily be modified to connect to third-party fiber.

[11] *See*, *e.g.*, *Wall Street Transcript Corp. Interview, John Peters – Sigma Networks* (John Peters, CEO, Sigma Networks: "[W]e've targeted our network to address the interconnection needs principally between all of the major sources and links of data traffic in the metro. We've targeted the major carrier hotels, the major data centers, the Internet backbone connection points 'the MAEs, the PAIXs' and the broadband backbone networks.").

[12] *See* D. Culver, *Construction Boom for Colocation*.

[13] *See* R. Duran, *Checking into Telecom Hotels*, Bus. Xpansion J. (Feb. 2001), http://www.bxjonline.com/issues/feb2001/telecom_hotels.asp.

[14] *See* D. Culver, *Construction Boom for Colocation* (collocation hotels provide "high-security facilities operated by independent companies that put telecom gear as close as possible to incumbent central offices without actually being there.").

[15] *See*, *e.g.*, R.J. Sherman, Janney Montgomery Scott, Investext Rpt No. 2121566, Exodus Communications – Company Report at *2 (Apr. 4, 2000) ("It is estimated that 50% of all Internet traffic flows from Exodus' data centers."); F. Billimoria, *et al.*, Hambrecht and Quist Inc., Investext Rpt No. 2724275, Exodus Communications – Company Report at *2 (Nov. 20, 1998) ("The company estimates that 10-12% of traffic that is carried over the Internet

growing at 100 percent a year, "and will consume 40% of total metro bandwidth by 2005."[16] Datacom hotels "tend to be concentrated in the top 15 Tier One metros, which account for 80% of demand."[17] Nonetheless, today there are alternative collocation providers in virtually all major metropolitan areas throughout the country. *See* Appendix G.

That there are many different points of traffic concentration is competitively significant in two important respects. First, high-traffic-volume nodes provide network economies of scale to many smaller competitors, by consolidating their traffic at a single physical location. To obtain competitive transport, a CLEC no longer has to grow organically; it can, instead, just locate itself in the right building. Second, the major competitive fiber-optic providers in an area are all very likely to route their networks to these locations – thus effectively providing connection to all points served by all the competing networks combined. The CLECs themselves can hand off traffic to each other, or an intermediary can bundle and resell their services as a single, integrated competitive service. Thus, while any single competitive fiber network may serve only a select number of point-to-point routes, that carrier will have access to the point-to-point networks of other competing carriers as well. The universe of total competitive fiber – not the point-to-point routes of any individual competitor – defines the geographic areas within which competitive transport facilities are now available.

Three years ago, the Commission downplayed the competitive significance of competitive transport on the ground that CLECs "require dedicated transport facilities that are more extensive than those that are currently deployed along the point-to-point routes."[18] The Commission stated that, "[w]ithout access to the incumbent's ubiquitous transport facilities, competitive LECs are faced with the delays and costs of deploying their own transport facilities to meet the demand" or "must utilize a patchwork of competitive alternatives, where available, to collect and route traffic to the required destination."[19] Whatever the merits to that concern three years ago, the market itself has overtaken it today. Competitive transport networks now overlap and converge. Today, CLECs routinely seek out competitive suppliers of fiber; the supposed administrative costs of building patchwork solutions have been readily overcome.

Marketplace experience firmly establishes that carriers will seek out competitive suppliers of fiber, even where it means relying on a patchwork of different networks, rather than the ubiquitous facilities of an ILEC.[20] This is precisely the way the competitive access business began, with the large interexchange carriers purchasing competitive fiber in just a single

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goes through an EXDS data center. They also noted that during peak periods, they are transmitting sustained levels of 2.4 gigabits/sec of traffic across the Internet, which we believe makes EXDS the 3rd or 4th largest generator of traffic.").

[16] *Lehman/McKinsey MAN Report* at 6.

[17] *Id.* at 6-7.

[18] *UNE Remand Order* ¶ 346.

[19] *Id.*

[20] *See*, *e.g.*, Joint Comments of Allegiance Telecom, Inc. and Focal Communications Corporation at 5, *Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, CC Docket No. 96-98 (FCC filed June 11, 2001) ("Where it is available, Allegiance and Focal purchase transport and fiber from third parties.").

location, at first, and slowly expanding from there.[21] AT&T and WorldCom found the business so compelling, that they spent $25 billion to acquire their two largest suppliers.[22] Today, as discussed in more detail below, CLECs are purchasing as much fiber as they can from wholesale suppliers, even though these suppliers do not necessarily offer fiber everywhere. These suppliers obviously wouldn't even be in business if CLECs were willing to purchase transport only from suppliers who offered them ubiquitous connectivity.

B. CLEC Fiber.

At the time of the *UNE Remand Order*, the Commission found that, based on market conditions at the end of 1998, "competitive LECs have deployed transport facilities along selected point-to-point routes, primarily in dense market areas."[23]

Since that time there has been a further, sharp increase in the availability of competitive alternatives to ILEC interoffice transport facilities.[24] At the time of the *UNE Remand* proceedings, for example, CLEC fiber networks spanned approximately 100,000 route miles (both local and long-haul).[25] Today, CLEC networks consist of at least 184,000 route miles of fiber (both local and long-haul).[26] While many CLECs do not publicly report how many purely local route miles of fiber they operate, information from CLECs that do release such totals confirms that the majority of this fiber is local.[27]

While CLECs have significantly expanded their own local fiber networks, there also has been a rapid increase in local fiber supplied by "carrier-agnostic" wholesale suppliers. These companies have invested well over $1 billion in deploying local fiber networks that they sell or lease to other carriers. As a result, for a growing number of CLECs, the fiber provided by these wholesale suppliers satisfies a large part of their demand for interoffice transport.

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[21] *See* Section III.B.

[22] *See* AT&T News Release, *AT&T Completes TCG Merger* (July 23, 1998); WorldCom Press Release, *WorldCom, Inc. and MFS Announce Merger to Form Premier Business Communications Company* (Aug. 26, 1996).

[23] *UNE Remand Order* ¶ 333.

[24] This competitive transport is available to wireless carriers, just as it is to CLECs. Moreover, wireless base stations and switches (MTSOs) typically handle sufficient volumes of traffic to justify new fiber connections.

[25] *See NPRG CLEC Report 2000, 12th ed.*, Ch. 6 at Table 5 (restated 1998 route miles). As described in the following note, the latest NPRG report excludes fiber for competitive Independent Operating Companies, utility CLECs, data providers, and Gig-E providers. To make an apples-to-apples comparison with the 2001 totals, we have removed from the 1998 totals the fiber for carriers that NPRG has placed in one of these categories.

[26] *NPRG CLEC Report 2002, 15th ed.*, Ch. 2 at Table 7; Ch. 4. This is a highly conservative estimate. It does not include 117,000 route-miles of fiber that NPRG lists for competitive Independent Operating Companies, utility CLECs, data providers, or Gig-E providers. Moreover, the total miles for 2001 have been adjusted downward to address the concerns that CLECs raised in the Special Access proceeding in April of 2001 (CC Docket No. 96-98).

[27] For example, of the 33 CLECs for which NPRG provides fiber-route miles, we have found only four examples (Adelphia, McLeod, Time Warner Telecom, and XO) where, based on CLECs' own public disclosures, the total route miles reported by NPRG appear to include significant amounts of long-haul fiber. At the same time, the total route miles reported by NPRG are *lower* than local-only route-mile totals provided by at least two CLECs (AT&T and Cablevision) and do not include any fiber route miles for WorldCom, which is one of the two largest CLECs.

The first competitive transport services involved the provision of "access" between large business customers and interexchange carriers. New York authorized interoffice competition in 1985, and that year Teleport built a fiber-optic network in lower Manhattan, to provide special access service to business customers, where the most concentrated wire centers in the nation reside. Sixteen other states had followed New York's lead by August 1986.[28] Institutional Communications Company (ICC), the second major CAP, was formed in 1986 in Washington, D.C.; it is now a part of MCI/WorldCom's MFS.[29] In 1987, Chicago Fiber Optic (soon to be MFS) began building a network to provide special access in downtown Chicago.[30] By 1990, CLECs had deployed 20 networks in 15 cities.[31] By 1995, 29 CAPs had deployed fiber-optic networks in approximately 100 cities, consisting of more than 21,000 route miles of fiber.[32]

Since the last UNE review, the number of "operational" and "on-net" CLEC networks in the 150 largest MSAs – which contain nearly 70 percent of the U.S. population[33] – has grown from approximately 1,100 to nearly 1,800. *See* Appendix K.[34] During this period, the average number of CLEC networks in the 150 largest MSAs grew by more than 60 percent. *See* Table 4. Today, 91 of the top 100 MSAs are served by at least three CLEC networks; 77 are served by at least seven, 59 are served by at least 10. *See* Appendix K. As these data make clear, CLEC fiber is by no means limited to dense urban areas. CLECs also have deployed fiber far outside of urban areas to reach large business customers in suburban and rural areas.[35]

Table 4. Average Number of CLEC Networks by MSA

MSA Rank	1998	2001	Percentage Increase
1-25	19.6	32.2	64%
26-50	10.2	15.0	47%
51-75	5.2	9.0	73%
76-100	4.0	6.6	65%
101-125	2.8	4.8	71%
126-150	2.8	3.4	21%

Sources: See Appendix M.

[28] *See* Semilof, *IntraLATA Competition: Lata Barrier Falls*, Network World at 11 (Aug. 25, 1986).

[29] *See NPRG 1999 CLEC Report, 10th ed.*, Ch. 2 at 3.

[30] *See NPRG 1999 CLEC Report, 10th ed.*, Ch. 2 at 3.

[31] *See* U.S. Dep't of Commerce, *U.S. Industrial Outlook* at 33-7 (1990).

[32] *See* Connecticut Research, *1995/96 Local Telecommunications Competition* at Table II-2 (7th ed. 1995).

[33] Rand McNally, *Commercial Atlas and Marketing Guide 2001* at 60-61, 83 (132nd ed. 2000).

[34] For purposes of these totals, we have counted all "voice networks" and "data networks" that NPRG's *CLEC Report 2002* lists as "operational." These totals may include some networks or parts of networks that CLECs operate with facilities leased from a third party, including an ILEC.

[35] *See also*, *e.g.*, K. Fairbank, *RAIL SWITCH; Union Pacific Develops High-Tech Subsidiary*, Dallas Morning News at 1D (Oct. 18, 2000) (Ekanet, a subsidiary of the Union Pacific railroad, "aims to provide services to underserved, primarily rural, markets west of the Mississippi River"); *Fujitsu Equipment Drives New Fiber Network Serving Northwestern South Dakota*, Bus. Wire (Nov. 6, 2000) (South Dakota Network "is now offering advanced telecommunications services to customers in rural northwest South Dakota through a 600-mile fiber-optic network").

Finally, there are new technologies on the near horizon that would enable additional fiber to be deployed without digging up city streets, which "could cut the time and cost of fiber installation in half."[36] For example, "CityNet Telecommunications aims to revolutionize the rollout of broadband services in cities by dispatching tiny robots to lay fiber-optic cables in sewer pipes."[37] The company already has agreements to deploy fiber in nine major cities (Houston, Pittsburgh, Dallas, Scottsdale, Indianapolis, Fort Worth, Omaha, San Antonio, and Albuquerque),[38] and is in talks with dozens of other cities. In April 2001, the company announced that it had secured $275 million in a new round of financing, which "underscores the novelty and promise of the . . . company's business."[39]

Many of the competitive transport facilities that CLECs have deployed are used to provide special access services. Special access revenues constitute a very large share of all interoffice transport revenues. Moreover, these revenues are highly concentrated in a relatively small number of wire centers,[40] making them an easy target for CLECs to serve with their own facilities. The Commission has found that "the revenues of competitive LECs come primarily from special access and local private line services."[41] CLECs now account for between 28 and 39 percent of all special access revenue, which is significantly larger than their share of the local exchange market as a whole.[42]

C. Wholesale Suppliers of Local Fiber.

In the past few years, there has been a dramatic increase in fiber supplied by alternative wholesale suppliers, which typically sell or lease dark fiber to other carriers, but do not

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[36] P. Davidson, *Robots Lay Fiber Optics in City Sewers*, USA Today (Nov. 27, 2000).

[37] *Id.*

[38] CityNet News Release, *City of Houston and CityNet Telecommunications Announce Agreement To Wire City with Fiber Optic Networks Through Sewers* (Jan. 9, 2002); CityNet News Release, *City of Pittsburgh and CityNet Communications Announce Agreement to Wire City with Fiber Optic Networks Through Sewers* (Oct. 26, 2001); CityNet News Release, *Mayor Touts "Smart" Alternative to Trenching Streets* (Oct. 16, 2000); CityNet News Release, *CityNet Inaugurates the First-Ever U.S. Fiber Optic Network Deployment Through City Sewer System* (Feb. 20, 2001); CityNet News Release, *CityNet Launches Last-Mile Fiber Optic Network in Indianapolis* (June 13, 2001).

[39] *CityNet Wins $275 Million in Funding*, Wash. Post (Apr. 10, 2001).

[40] *See* USTA, *Competition for Special Access Service, High-Capacity Loops, and Interoffice Transport*, CC Docket No. 96-98, at 3 & Table 1 (FCC filed Apr. 5, 2001) ("more than 80 percent of SBC's special access revenues are generated in less than 25 percent of the wire centers in which it is providing special access. In Verizon's region, more than 80 percent of special access revenues are generated from about 20 percent of Verizon's total wire centers. In Qwest's region, more than 60 percent of special access revenues are generated from 11 percent of Qwest's total wire centers. In BellSouth's region, 91 percent of special access revenues are generated from 20 percent of BellSouth's total wire centers.").

[41] *Promotion of Competitive Networks in Local Telecommunications Markets*, First Report and Order and Further Notice of Proposed Rulemaking in WT Docket No. 99-217, Fifth Report and Order and Memorandum Opinion and Order in CC Docket No. 96-98, and Fourth Report and Order and Memorandum Opinion and Order in CC Docket No. 88-57, WT Docket No. 99-217; CC Docket No. 96-98; CC Docket No. 88-57, FCC 00-366, ¶ 24 (rel. Oct. 25, 2000).

[42] *See* Appendix L & Section V; *see also* Section I.D.

themselves engage in the provision of telecommunications services. *See* Table 5.[43] Five of these alternative fiber suppliers have formed an industry coalition – the Coalition of Competitive Fiber Providers – which states that its members' business plans involve the "provision of competitive fiber-based transport services and dark fiber to competitive local exchange carriers . . . collocated in ILEC central offices."[44] The Coalition claims that its "members together represent a total capital investment of approximately $1 billion."[45] According to analysts, metropolitan fiber suppliers have raised about $2 billion in capital since the third quarter of 2000, and are still "some of the few getting capital."[46] These companies have recently raised significant additional funding through debt and vendor financing.[47] According to consulting firms Cambridge Strategic Management Partners and McKinsey & Co., "[t]he market for reselling . . . dark fiber to ISPs and telecom carriers is projected to grow from about $2 billion today to about $10 billion by 2006."[48]

Just like CLECs, alternative wholesale suppliers of fiber connect end users to their fiber rings, which in turn connect to interexchange carrier POPs and ILEC central offices.[49] Because

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[43] *See*, *e.g.*, J. Grubman, Salomon Smith Barney, *Grubman's State of the Union* at 15 (Mar. 21, 2001) ("there is an avalanche of metro capacity being deployed."); *Robertson Stephens Provides Outlook on Telecom Services*, PR Newswire (Sept. 7, 2000) ("We believe that we have reached the beginning of the end of the metropolitan bandwidth bottleneck . . . We are seeing a new generation of metropolitan bandwidth operators that will provide 100 Mbps plus connectivity at low cost to end users.").

[44] Coalition of Competitive Fiber Providers, Petition for Declaratory Ruling at 2, *Application of Sections 251(b)(4) and 224(f)(1) of the Communications Act of 1934, as amended, to Central Office Facilities of Incumbent Local Exchange Carriers*, CC Docket No. 01-77 (FCC filed Mar. 15, 2001) ("*Coalition of Competitive Fiber Providers Petition*"). The five coalition members are American Fiber Systems, Fiber Technologies, Global Metro Networks, Telergy, and Telseon.

[45] *Coalition of Competitive Fiber Providers Petition* at 2.

[46] P. Brown, *Despite Tighter Purse Strings, Cash Is Still Streaming to Metro Providers*, Tele.com (Aug. 13, 2001) (citing the Yankee Group and quoting Lehman Brothers Equity Research telecom analyst Blake Bath).

[47] *See*, *e.g.*, Looking Glass Networks Press Release, *Looking Glass Networks Nets Huge Debt Financing Round* (Mar. 2, 2001) (Looking Glass raised $275 million in debt in February of 2001); Metromedia Fiber Network Press Release, *Metromedia Fiber Network Successfully Completes $611 Million Financing Package* (Oct. 2, 2001) (Metromedia raised a total of $611 million in September of 2001); Yipes Press Release, *Yipes Closes $200 Million "C" Round of Funding* (Feb. 5, 2001) (Yipes secured $200 million in equity financing); Telseon Press Release, *Telseon Receive $175 Million in Financing* (Feb. 6, 2001) (Telseon secured $100 million in equity financing and $75 million in capital lease financing.).

[48] N. Orman, *Networking Startups Battle for Cities*, Silicon Valley/San Jose Bus. J. (Oct. 26, 2001).

[49] *See*, *e.g.*, *Coalition of Competitive Fiber Providers Petition* at 1 (emphasis added) (Our members "provide, or will provide, advanced fiber-based transport services, *including interoffice transport*, and/or dark fiber to end users and other telecommunications carriers. Coalition members together offer these services and products in virtually every region of the 'lower 48' states and the District of Columbia."); Looking Glass Networks, *FAQ*, http://www.lglass.net/aboutus/faq.jsp (Looking Glass's target customers include "Long Haul Carriers (IXCs), Incumbent Local Exchange Carriers (ILECs), Competitive Local Exchange Carriers (CLECs), Internet Service Providers (ISPs), data centers, bandwidth trading organizations, storage facility providers, wireless data providers and large enterprise customers."); *Wall Street Transcript Corp. Interview, John Peters – Sigma Networks* (John Peters, CEO, Sigma Networks: We're a Carrier's carrier. Our customers tend to be the backbone carriers that are looking to extend their reach within the metro, the service providers that host applications within the various data centers that need to get traffic to and from the various backbone networks, and then third would be broadband access networks, cable, DSL, and fixed wireless suppliers that need to interconnect their access networks into the metro to get to the data centers and the backbones.").

these alternative suppliers are "carrier agnostic," they can use their networks to serve multiple carriers at once, significantly improving the economics of deploying fiber.[50] For a growing number of CLECs, the fiber provided by these wholesale suppliers satisfies a large part of their demand for last-mile local connectivity and interoffice transport.[51] In fact, these alternative suppliers' networks are so expansive that even ILECs have begun purchasing fiber from them.[52]

In addition to this new breed of wholesale fiber suppliers, many of the nation's utility companies are now supplying local fiber to CLECs. *See* Table 6. Utility companies control a significant portion of the nation's fiber infrastructure – as much as 35 percent according to one source.[53] These companies have the advantage of being able to deploy fiber using their existing infrastructure. As one analyst notes, "If a company already has wires or pipes in the ground, the cost of entry is comparatively low."[54] Another analyst notes that "roughly half of the new metro networks being built in the United States are being constructed by utilities."[55]

Finally, several of nation's largest operators of long-haul fiber networks have recently constructed metropolitan fiber networks. *See* Table 7. These carriers have sold dark fiber on their long-haul networks to CLECs for many years, and have now begun leasing dark fiber on

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[50] *See*, *e.g.*, *Wall Street Transcript Corp. Interview, John Peters – Sigma Networks* (John Peters, CEO, Sigma Networks: "[E]ach of these metro networks requires a very large amount of traffic to drive the unit cost down to a reasonable level. So by having us deploy a common network infrastructure that can be used by many carriers, we can get the traffic volumes aggregated on our network much more easily than any individual carrier can do on their own and therefore we can drive unit cost down faster."); *id.* (John Peters, CEO, Sigma Networks: "We take a position of neutrality with regard to our customers. . . . We're a neutral provider of broadband interconnections."); Looking Glass Networks, *Collocation*, http://www.lglass.net/products/collocation.jsp (Looking Glass Networks provides "carrier-neutral facilities"); F.J. Governali, *et al*., Credit Suisse First Boston Corp., Investext Rpt. No. 2699472, Northeast Optic Network – Company Report at *3 (Sept. 10, 1998) (NEON's business plan "is lower risk than most of the emerging nationwide network builders" because it "plans to only operate as a carrier's carrier, which takes away the risk of competing with other carriers for end-user services and significantly decreases operating expenses.").

[51] *See*, *e.g.*, Allegiance Telecom Inc., Form 10-K405 (SEC filed Mar. 30, 2001) (Allegiance has leased fiber from suppliers in 25 markets, and claims that "[t]hese fiber rings are expected to provide [Allegiance] with a reliable, diverse and robust connection to most of [its] central office locations throughout a market."); *CTC Communications Announces Fully Funded Local Fiber Build-Out Plan; High Bandwidth Core Fiber Network to Be Extended to Verizon Local Switching Offices*, Bus. Wire (Dec. 19, 2000) (CTC purchased from a "number of dark fiber suppliers" "local fiber in selected geographical areas of eastern Massachusetts, southern New Hampshire, southern Maine and Rhode Island," which it claims will "extend CTC's existing high bandwidth fiber network backbone to Verizon local switching offices," and enable it to "eliminate the need for leased inter-office Verizon facilities."); Sprint Press Release, *Sprint Signs Multiyear Contract with Metromedia Fiber Network for Enhanced Access to Major U.S. Markets* (Dec. 4, 2001) (Sprint expects to begin using MFN networks in initial markets in the second quarter of 2002 and in all 10 cities by the end of 2002).

[52] *See*, *e.g.*, B. Wallace, *Bell Atlantic Eyes Further Expansion,* TechWeb (Oct. 18, 1999), http://www.informationweek.com/757/atlantic.htm (Bell Atlantic invested $550 million to gain access to MFN's local fiber networks in 50 cities); D. Rohde, *Looking for SBC Over the Horizon*, Network World Fusion (Aug. 21, 2000), http://www.nwfusion.com/columnists/2000/0821rohde.html?nf (SBC will buy local dark fiber nationwide from MFN).

[53] *See* J. Krause, *They've Got the Power*, The Standard (Dec. 27, 1999).

[54] I. McDonald, *Butterfly Companies: The Web Has Transformed These Utilities Firms*, The Street.com (Nov. 3, 2000), http://www.thestreet.com/funds/fundjunkie/1155477.html.

[55] K. Maddox, *New Era, New Partner – Old-Line Manufacturer Chooses Cinergy for Network Build*, tele.com (Mar. 5, 2001) (citing Forrester analyst Maribel Dolinov).

their metropolitan fiber networks as well. These carriers also have begun providing competitive local services to customers directly. To cite just one example, in January of this year, the District of Columbia City government agreed to lease dark fiber from Level 3 to create a high-speed data network linking government buildings at various locations across the city.[56]

[56] *Level 3 Selling Dark Fiber to District of Columbia City Government*, CLEC.com (Jan. 31, 2002), http://www.clec.com/newsprint.asp?ContentID=2147455397.

Table 5. Wholesale Local Fiber Suppliers		
	Cities with Operational and Planned(*) Networks	**Network Details**
Metromedia Fiber Networks	Seattle, Portland, San Francisco/Bay Area, Los Angeles, Phoenix, Denver, Dallas, Houston, Kansas City, Chicago, Miami, Boston, New York, Washington D.C., Atlanta	"Our existing intra-city networks consist of approximately 1,579,000 fiber miles covering in excess of 3,987 route miles in the United States."
Fiberworks	Atlanta, Charlotte, Birmingham*, Orlando*, Miami/Ft. Lauderdale*, Jacksonville*, Tampa/St. Petersburg*, New Orleans*, Raleigh/Durham*, Greenville/Spartanburg*, Nashville*, Dallas/Ft. Worth*, Austin*, San Antonio*, Houston*	"Fiberworks has installed over 3,000 fiber route miles."
American Fiber Systems	Salt Lake City, Kansas City, Nashville, Minneapolis, Cleveland AFS is developing dark fiber optic rings in 126 other cities across the country.	AFS plans to "help alleviate the band-width capacity shortage by installing more than 1.4 million miles of fiber-optic strands in second and third-tier U.S. cities over the next seven years."
Fibertech Networks	Albany, Buffalo, Rochester, Syracuse. Pending Completion: Hartford, Indianapolis, New Haven, Springfield, MA, Worcester, Columbus, Pittsburgh, Providence. Planned: 48 additional markets	Fiber Technologies "planned network infrastructure and diverse ring topology will encompass more than 40 cities, 6,400 route miles and in excess of 306,000 fiber miles."
Yipes	Santa Clara, Atlanta, Boston, Chicago, Dallas, Denver, Ft. Collins, Ft. Lauderdale, Houston, Longmont, Miami, New York, Palo Alto, Philadelphia, Pittsburgh, Riverside, San Diego, San Francisco, Seattle, Washington, D.C., Worcester	"Yipes has now over 3,600 route miles of fiber in our twenty-one markets, which is twice the route miles we had in December. With multiple fibers in each of its markets, Yipes has now lit 32,000 miles of fiber encompassing 128 metropolitan rings."
Telseon	Atlanta, Chicago, Cincinnati, Dallas, Denver, Detroit, Houston, Los Angeles, Miami, New York, Northern Virginia, Orlando, Philadelphia, Phoenix, San Diego, San Francisco Bay Area, Seattle, Silicon Valley, St. Louis, Tampa	"In 2001, Telseon increased its network points of presence from 120 to 160 locations . . . In 2002, Telseon will continue to expand its network to include multiple tenant buildings and large enterprises."
Looking Glass	Seattle, San Francisco, Los Angeles, Dallas, Houston, Atlanta, Chicago, Washington D.C., New York, Boston	With "over $15 million in signed customer contracts," Looking Glass "offers the full range of carrier class SONET, Ethernet and Wavelength lit services from 10 Mbps to 10 Gbps, along with dark fiber and carrier neutral collocation."
Northeast Optic Network (NEON)	Baltimore*, Boston, Bridgeport, Hartford, Keene, Manchester, Nashua, New Haven, New York, Newark*, Philadelphia*, Portland, Portsmouth, Providence*, Springfield, Stamford, Washington, D.C.,* White Plains, Worcester	NEON's "interstate, intercity, and local loop facilities comprise a network of approximately 1,900 route miles and more than 81,000 fiber miles."
Progress Telecom	Atlanta, Miami, New York, Raleigh, Saint Petersburg, South Florida, Tampa, Washington D.C.	"Progress Telecom incorporates approximately 130,000 fiber miles and 7,200 route miles in its network including over 150 Points-of-Presence (POPs)."
EPIK Communications	The lit network reaches 12 key cities, including the cities of Atlanta, Jacksonville, Orlando, Tampa, and Miami; EPIK is also developing fiber "metro rings" in these five cities totaling approximately 400 route miles.	EPIK has lit a 1,850 mile regional fiber in network in the Southeastern United States. EPIK is also developing fiber metro rings in Atlanta, Jacksonville, Orlando, Tampa, and Miami totaling 400 route miles.
NEESCom	Providence, Worcester, Metro West (MA region east of Worcester)	NEESCom has deployed "more than 700 route miles of dark fiber."
Sources: See Appendix M.		

Table 6. Utilities Providing Local Fiber	
Alameda Power & Telecom	"finalized a $16 million contract with Evansville, Ind.-based Vectren Communications Services for construction of a hybrid fiber optic/coaxial telecommunications network.," which "will allow the municipal utility to offer telecommunication services to its customers."
Bristol Virginia Utilities Board	"Six businesses now have high-speed Internet connections through the city's fiber-optic network, and two dozen others have requested the service. . . . Several telecommunications companies are interested in leasing the capacity to provide . . . telephone service."
Cinergy Communications	Cinergy Communications (a telecom subsidiary of Cincinnati's gas and electric provider, Cinergy Corp.) has begun leasing its fiber network that circles Cincinnati.
ConEdison Communications of New York	"ConEdison has embarked on a push to become a fiber-based carrier's carrier in the New York metro area, and is deploying all new fiber in ConEd's conduits. . . . 'If you're a retail provider and you touch our network at any POP, you could buy whatever unit of bandwidth you want into any building we have on the network,' [Peter Rust, president and CEO of ConEdison Communications] explained. 'You could go after that building, sell one or two customers, buy just what you need to cover those two customers and grow the bandwidth as you need it.'"
Edison Carrier Solutions	"San Diego's Edison Carrier Solutions has built a Southern Cal. network 2nd only to the incumbent phone provider and concentrates on SONET transport, also offering managed wavelength service and dark fiber leasing."
Electric Power Board of Chattanooga	"EPB, the [Chattanooga] city-owned electric utility, expanded two years ago into telecommunications to capitalize on the utility's fiber-optic lines originally installed to help with communications for its electricity service."
El Paso Global Networks	El Paso Global Networks (a subsidiary of natural gas and energy company El Paso Corp.) plans to spend $2 billion over the next four years on a nationwide fiberoptic network and "plans to overbuild its metropolitan areas to provide better connectivity."
FPL FiberNet	FPL FiberNet (a subsidiary of the utility holding group that includes Florida Power & Light) has a 2000 mile fiber network in Florida. It provides connectivity to major telecom centers in Florida, "including leading carrier hotels, NAP initiatives, international cable-heads and large central offices."
Grant County Public Utility District	"GCPUD will provide video services over its existing fiber-optic infrastructure, known as Zipp. When completed in 2005, the Zipp network will contain some 50,000 mi of fiber in its effort to reach 40,000 homes, businesses, and farms throughout Grant County. To date, the network passes about 7,000 homes with approximately 2,000 customers 'lit' and receiving services."
Lafayette Utilities System	"The Lafayette Utilities System has completed a 65-mile, 96-strand fiber-optic loop that offers broadband throughout the city. The loop passes within 1 mile of nearly every home in the city limits."
PPL Telecom	PPL Telecom will market its services in five metropolitan areas that company officials believe are underserved – the Lehigh Valley, Lancaster, Harrisburg, Scranton/Wilkes-Barre and Williamsport. "Our fiber, as it exists today, is within half a mile of 20,000 office buildings."
Progress Telecom	Progress Telecom is "building local metropolitan fiber networks to try to get the capacity out close to the buildings and the consumers where they need it."
Reliant Energy	Operates a 67-route mile fiber backbone in Houston.
Sempra Communications of Los Angeles	"L.A. utility firm Sempra Communications found a technique for running fiber conduit through pipelines without interrupting gas transmission and is attacking the last mile as 'the gold mine of the [telecom] industry.'
Telergy MidAtlantic	"Business customers in Northern New Jersey and Pennsylvania now have access to a powerful new source for telecommunications services. TMA combines the resources of Telergy's established telecom network with GPU's extensive last mile reach and communications construction experience."
Touch America (formerly Montana Power)	Owns and operates a 23,000-route-mile, state-of-the-art, high-speed fiber-optic network that will span 26,000-route miles, cross 40 states, and reach more than 140 major cities in 2002. Its network is used for long-haul services and "for Touch America's own direct connections to individuals and businesses through its wireless services, metropolitan fiber offerings, and private line, long-distance and Internet applications."

Table 7. Local Fiber Networks of IXCs That Supply Dark Fiber	
Company	**Cities with Operational and Planned(*) Networks**
Williams	Anaheim, Atlanta, Baltimore, Boston, Chicago, Dallas, Houston, Los Angeles, Miami, Minneapolis, New York, Newark, Philadelphia, Phoenix, San Francisco, San Jose, Santa Clara, Seattle, St. Louis, Washington, D.C. (*construction is planned in 40 more cities by the end of 2001)
Level 3	Atlanta, Baltimore, Boston, Chicago, Cincinnati, Dallas, Denver, Detroit, Jersey City, Houston, Long Island, Los Angeles, Miami, New York, Newark, Orlando, Philadelphia, Phoenix, San Diego, San Francisco, San Jose, Seattle, St. Louis, Stamford, Tampa, Washington, D.C.
Global Crossing	New York, Philadelphia, Washington, D.C., Atlanta, Miami, Dallas, Chicago, San Francisco, San Jose, Los Angeles
Qwest	Baltimore, Chicago, Dallas/Ft. Worth, Houston, Kansas City, Los Angeles, New York, Sacramento, San Francisco, San Jose, St. Louis, Washington, D.C.
Sources: See Appendix M.	

IV. LOCAL LOOPS

As the Commission has recognized, loops come in a wide range of capacities. The availability of competitive substitutes varies accordingly. In addition, the availability of substitutes varies significantly among geographic markets.

A. High-Capacity Loops.

The FCC defines a "high-capacity loop" as a loop from a customer to an ILEC central office that is capable of supporting a service at DS-1 speeds (*i.e.*, 1.544 Mbps) or higher.[1] A DS-1 facility consists of 24 individual 64 kbps DS-0 circuits, the bandwidth normally used for a single voice channel.[2] The individual circuits on DS-1 loops and higher can, however, be configured to provide any mix of voice and data services.[3] High-capacity loops are almost always provided to medium or large business customers.

As described in Section III, competitive access providers began deploying fiber networks immediately after the Bell break up, to provide interoffice transport between the ILECs' Class 5 switches and the Interexchange Carriers' Class 4 counterparts. CLECs then began extending their fiber between ILEC central offices. They then moved beyond carrier-to-carrier services, extending their fiber to provide a full range of high-capacity local services to large private customers.

The economics of supplying high-capacity loops are exactly the same in the service of large customers as they are in the service of carriers. Either way, high traffic volumes between specific pairs of points justify the deployment of new fiber. And the further the competitive fiber network runs, the more economical it becomes to add customers along the existing route, and to extend the fiber further still.

1. CLEC Fiber as a Substitute for High-Capacity ILEC Loops.

Collectively, CLECs use their own last-mile facilities to serve the vast majority of their large business customers. CLECs serve no fewer than 13 million business lines and likely closer to 20 million business lines using their own switches, yet they have obtained only about 1.5 million stand-alone unbundled loops to serve business customers. *See* Table 1.[4]

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[1] 47 C.F.R. § 51.319(a)(1) ("The local loop network element is defined as a transmission facility between a distribution frame (or its equivalent) in an incumbent LEC central office and the loop demarcation point at an end-user customer premises. . . . The local loop includes, but is not limited to, DS1, DS3, fiber, and other high capacity loops.").

[2] *See* Whatis.com, *Digital Signal X*, http://whatis.techtarget.com/definition/0,,sid9_gci212004,00.html (DS0 has "a transmission rate of 64 kbps, the bandwidth normally used for one telephone voice channel." DS1 "is 24 DS0 (64 kbps) signals.").

[3] *See* Qwest, *Data, DS1*, http://www.qwest.com/pcat/small_business/product/1,1354,140_3_2,00.html ("Each DS-1 Service comprises 24 channels that may be assigned in a wide variety of ways to support switched access, local exchange service, low-speed data, voice grade communications, audio services and digital data services.").

[4] This calculation is a conservative estimate of the number of larger business customers that CLECs serve over their own loop facilities because many of the stand-alone unbundled loops that CLECs have obtained are likely used for smaller business customers.

Table 1. CLEC Business Lines Provided Over CLEC-Owned Last-Mile Facilities			
	Total Facilities-Based CLEC Business Lines	**Unbundled Business Loops***	**Business Lines Provided Over CLECs' Own Loops**
Verizon**	3.7 – 6.8 million	467,000	3.3 – 6.3 million
SBC***	4.5 – 7.4 million	765,000	3.7 – 6.7 million
BellSouth	1.8 – 3.2 million	229,000	1.6 – 3.0 million
Qwest	2.9 million	63,000	2.8 million
Total	**13 – 20 million**	**1.5 million**	**11 – 19 million**

*ILECs do not maintain data on whether an unbundled loop is used to serve a business or residential customer. We have developed the estimate of unbundled loops used to serve business customers as follows: CLECs provide at least 3 million residential lines over facilities they have deployed themselves, and approximately 1.5 million of these lines are provided over cable telephony networks. We assume the remaining 1.5 million residential lines are provided using unbundled loops, and that all other stand-alone unbundled loops provided by ILECs to CLECs are used to serve business customers.

**Total for Verizon does not include the former GTE service area. ***Total for SBC does not include Connecticut.

Any count of "lines," however, severely underestimates the CLECs' actual share of the business market. A high-capacity line represents more market share than a low-capacity line, and CLECs tilt their businesses strongly toward the former. While CLECs as a whole supply a total of between 13 and 20 million business lines using their own switches, 12 of the CLECs included in that total supply over 156 million voice-grade-equivalent *circuits*.[5] AT&T's Business division reports serving 2.7 million "local voice lines" but "over 30M DS0 equivalents."[6]

Based on the highly conservative count of *lines* that CLECs provide over their own facilities, the CLECs now supply at least 20 percent and likely closer to 28 percent of all business lines nationwide. *See* Figure 1. That percentage is undoubtedly much higher in major metropolitan areas where the largest business customers are concentrated.[7] The FCC's own data confirm that the CLECs' share of large business customers is considerably higher than their share of the overall business market.[8]

[5] *See* Section I.B & Table 4, Appendix A.

[6] D. Dorman, President, AT&T, *Presentation Before the Lehman Brothers T3 Telecom, Trends & Technology Conference* (Dec. 6, 2001).

[7] *See, e.g.*, *UNE Remand Order* ¶ 291, n.573 ("The local competition that has developed has focused on larger business customers in large cities, not on residential or small business customers."); FCC, *Biennial Regulatory Review 2000 – Staff Report*, App. IV, Pt. 54, 15 FCC Rcd 21089, 21266 (2000) ("Competition for business customers in metropolitan areas has, in general, developed more rapidly than competition for residential customers or customers in rural areas."); *FCC Local Competition Report, Dec. 1998 ed.* at 2 ("Facilities-based CLECs appear to have concentrated in more urbanized areas.").

[8] According to FCC's most recent *Local Competition Report*, CLECs' share of the "Medium to Large Business Market" was nearly four times their share of the "residential and small business market." *FCC Local Competition Report, Feb. 2002 ed.* at Table 2.

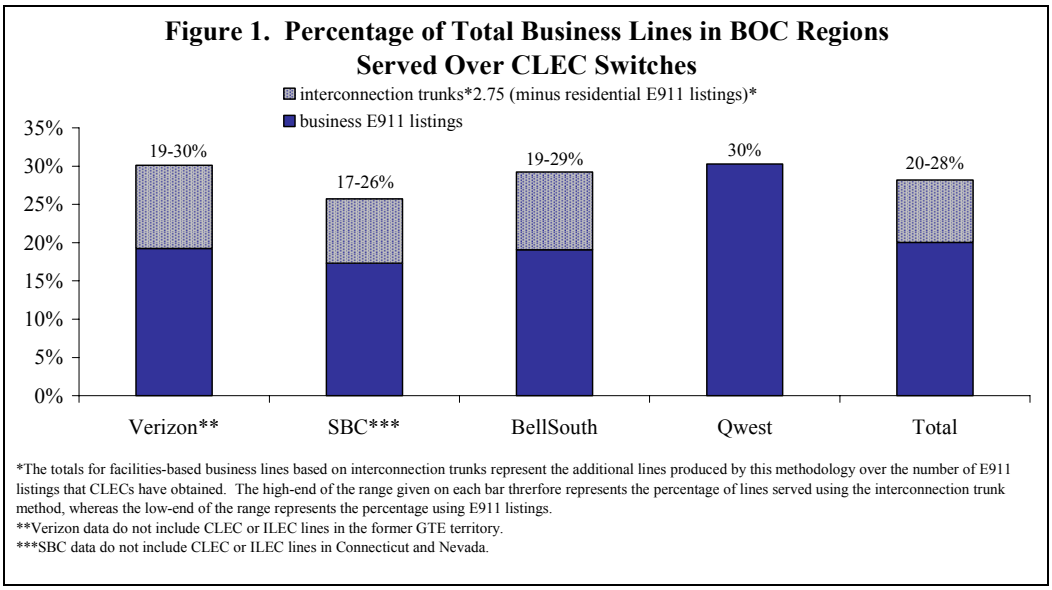

Figure 1. Percentage of Total Business Lines in BOC Regions Served Over CLEC Switches

*The totals for facilities-based business lines based on interconnection trunks represent the additional lines produced by this methodology over the number of E911 listings that CLECs have obtained. The high-end of the range given on each bar threrfore represents the percentage of lines served using the interconnection trunk method, whereas the low-end of the range represents the percentage using E911 listings.
**Verizon data do not include CLEC or ILEC lines in the former GTE territory.
***SBC data do not include CLEC or ILEC lines in Connecticut and Nevada.

These totals also are consistent with the significant inroads that CLECs have made into the special access market. The provision of special access service typically involves both a high-capacity loop and, as discussed in Section III, interoffice transport. Because special access revenues are highly concentrated among a relatively small number of wire centers, CLECs have been able precisely to target their facilities to serve this lucrative market. Today, CLECs account for between 28 and 39 percent of all special access revenue.[9]

It does not take a very far-flung network to reach a very significant number of high-volume customers. It has been estimated that, in a typical Tier-One MSA, just 200 to 300 multi-tenant units – out of an average of 15,000 or more multi-tenant units in such MSAs – generate an estimated *80 percent* of the data revenues generated in those MSAs.[10] And the top 15 MSAs generate almost 80 percent of the nation's data traffic.[11] Just four MSAs – New York, San Francisco, Washington, D.C., and Los Angeles – generate some 40 percent.[12]

Most CLECs do not report how many buildings their fiber networks serve.[13] Public data are available for only about 20 CLECs;[14] as of year-end 2001 this small subset of CLECs

[9] *See* Appendix L.

[10] *See Lehman/McKinsey MAN Report* at 8 (emphasis added) ("enterprise traffic is currently very concentrated, as in a typical Tier One MSA, 200 to 300 MTUs (of more than 15,000) constitute 80% of data revenues.").

[11] *See id.* at Figure 3.

[12] *See id.* at 6-7.

[13] *See*, *e.g.*, *CSFB 3Q01 CLEC Vital Signs Review* at Exh. 16 (total buildings data for 8 of the 14 profiled CLECs were not available); J. Atkin & D. Coleman, Dain Rauscher Wessels, *City Light: An Investor's Guide to Metropolitan Optical Services* at 11 (Mar. 22, 2001) ("Few carriers release detailed data on their fiber networks.").

[14] By comparison, there are at least 110 CLECs as well as numerous wholesale fiber suppliers that currently operate metropolitan networks. *See NPRG CLEC Report 2002, 15th ed.*, Ch. 6; Section III.C.

operated networks that served approximately 330,000 buildings.[15] This figure, however, includes "off-net" buildings – buildings served in part using facilities leased or resold from another competing carrier or an ILEC. CLECs have estimated that the number of unique office buildings served entirely by their fiber networks is roughly 30,000 nationwide.[16]

Given that CLECs route them to large commercial office buildings and other points of high traffic concentration, CLEC networks are clearly capable of serving far more high-capacity business lines than they currently do. Once they extend their network to serve one customer in a building, CLECs can vie for the business of all the other tenants, too. And CLEC fiber networks are now so extensive that they readily can be – and routinely are – extended as needed to pick up additional traffic from new customers in adjacent buildings, or down the block, and on outward, incrementally, from there. Once an initial fiber ring is deployed in a metropolitan area, extending that fiber incrementally to new customers is comparatively cheap.[17] When they deploy fiber, carriers invariably deploy far more capacity than they can use immediately, to facilitate precisely this process of incremental future development.[18] And the bigger the network grows, the more economical it becomes to extend it to reach additional, lower-traffic, lower-revenue customers.

Rapidly rising traffic volumes make the economics of deploying competitive fiber increasingly attractive. Traffic volumes from "large enterprises" – which generate half of the traffic in metropolitan markets[19] – are growing at an estimated 40 percent a year.[20] Data traffic for small and mid-size enterprises is growing at an estimated 60 to 70 percent a year.[21] As traffic volumes rise, competitive fiber networks quickly move from merely "competitive" to markedly

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[15] *NPRG CLEC Report 2002, 15th ed.*, Ch. 4 at Table 19. This is a highly conservative estimate. It excludes not only the buildings served by literally dozens of CLECs, but also does not include the 27,000 additional buildings NPRG reports for competitive Independent Operating Companies, utility CLECs, data providers, Gig-E providers, fiber layers, and other providers. *See id.* Moreover, the total buildings have been adjusted downward to address the concerns that CLECs raised in the Special Access proceeding in April of 2001 (CC Docket No. 96-98).

[16] *See* Joint Comments of Allegiance Telecom, Inc. and Focal Communications Corporation at 25, *Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, CC Docket No. 96-98 (FCC filed June 11, 2001); Comments of WorldCom, Inc. at 7, *Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, CC Docket No. 96-98 (FCC filed June 11, 2001).

[17] As the FCC has noted, "[t]he technological advances in fiber and electronics have made expansion of transport capacity relatively inexpensive. Once a competitor has infrastructure in place, the marginal cost of adding customers is not significant, and competitors are not likely to lack sufficient capacity for an extended period." Brief of FCC, Respondent, at 36, *MCI WorldCom v. FCC*, No. 99-1395 *et al*. (D.C. Cir. filed Nov. 30, 2000).

[18] *See* B. Gain & D. Dunn, *Is the Fiber Glut for Real?*, EBN (Dec. 10, 2001), http://www.ebnonline.com/story/OEG20011210S0066 ("Because excavation costs are high, many telcos overbuilt intentionally to avoid having to tear up lines to meet future demand."); O. Kharif, *The Fiber-Optic "Glut" – In a New Light*, Bus. Week Online (Aug. 31, 2001), http://www.businessweek.com/bwdaily/dnflash/aug2001/nf20010831_396.htm ("Since the total cost of laying cable can reach $1 million per mile – including everything from digging trenches to obtaining permits – telecoms often drop as much fiber into a ditch as they can. That's far cheaper than installing capacity as demand dictates."); *Federal-State Joint Board on Universal Service*, Tenth Report and Order, 14 FCC Rcd 20156, ¶ 199 (1999) ("industry practice [is to build] distribution plant to meet ultimate demand.").

[19] *See Lehman/McKinsey MAN Report* at 8.

[20] *See id.*

[21] *See id.*

superior. Next-generation technologies (SONET-lite, Metro DWDM and Gigabit Ethernet) are estimated to be 30 to 70 percent more cost-efficient than legacy networks.[22] Network capacities are rarely if ever an issue; year by year it gets easier and cheaper to boost the capacity of existing fiber by upgrading the electronics that "light" it. Data-carrying capacities are indeed doubling about every 9-10 months.[23]

In these circumstances, it is not surprising to find that CLECs and wholesale fiber suppliers widely tout their willingness to extend their networks to pick up new customers and traffic.[24] One declares that its network is "available" to all businesses that "pass within 6000 feet"[25] and will "provide[] the fiber-optic link from its access network directly into the building."[26] Another emphasizes its willingness to "work together with a customer to construct a spur to that customer from an existing fiber ring."[27] Another will "bring our fiber right up to our customers' floors in their buildings and provide them with wall-to-wall seamless connectivity."[28] Another will "provide its customers with fiber optic connectivity to virtually any location in its service territory" using a process that is "quick and efficient."[29] Another will connect to "the main Class-A buildings in a downtown business district."[30] CLECs also may extend their fiber networks through fixed wireless connections,[31] which can be deployed much more quickly and

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[22] *See id.* at 1.

[23] *See*, *e.g.*, *Industry Buzz*, Forbes (Jan. 8, 2001), http://www.forbes.com/forbes/2001/0108/154s01.html (Lucent states that "fiber-optic cable capacity will double in the first nine months of [2001]"); L. Walker, *Fiber Optimist Revolution,* Amarillo Globe-News (Oct. 15, 2000), http://www.amarillonet.com/stories/101500/ bus_fiberopt.shtml (quoting Dan Schaeffer, Cogent Communications: "Fiber is doubling its capacity to carry data every 10 months.").

[24] Time Warner Telecom's CEO, Larissa Herda, recently noted that her company was recently able to win a large-customer contract because of their "ability to construct our own fiber facilities into their seven locations in four cities within 30 days." *See Time Warner Telecom Announces Fourth Quarter Results, Conference Call* (Feb. 5, 2002).

[25] *Fiberworks to Light Up Atlanta and Alleviate Atlanta's Bandwidth Bottleneck,* Bus. Wire (Aug. 22, 2000).

[26] M. Fuller, *Fiberworks to Deploy Carrier-Agnostic All-Optical Local-Access Networks*, Lightwave (Nov. 2000).

[27] Comments of Yipes Transmission, Inc. at 13, *Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, CC Docket No. 96-98 (FCC filed June 11, 2001).

[28] A. Lindstrom, *Fiber: Part II*, America's Network (Sept. 1, 1998).

[29] F.J. Governali, *et al*., Credit Suisse First Boston Corp., Investext Rpt. No. 2699472, Northeast Optic Network – Company Report at *4 (Sept. 10, 1998).

[30] *Interview with Robert Manning, CFO, Intermedia Communications*, CNBC/Dow Jones (June 25, 1998).

[31] *See*, *e.g.,* E.G. Henderson, Duff & Phelps Credit Rating Co., Investext Rpt. No. 2988183, Telecom Services Update – Industry Report at *7 (Nov. 9, 1999) (XO Communications "establishes a wireless link to buildings first and later builds fiber to the buildings after the company has reached its desired customer penetration rate to justify building."); Comments of WorldCom, Inc. at i, *Amendment of Part 2 of the Commission's Rules To Allocate Spectrum Below 3 GHz for Mobile and Fixed Services To Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems*, WT Docket No. 00-258 (FCC filed Feb. 22, 2001) (WorldCom has "invested over $1 billion for the rights to use MMDS/ITFS spectrum in 160 markets throughout the United States"); *AT&T/TCG Application* at 7-8 ("AT&T's acquisition of TCG holds great promise for the development of facilities-based local competition by taking full advantage of the complementary aspects of AT&T's long distance and wireless networks and marketing expertise and TCG's local fiber optic and broadband wireless capabilities and rights-of-way.").

cheaply than fiber.[32]

2. CLECs Are Making Little Use of Unbundled High-Capacity Loops.

Although ILECs have made unbundled high-capacity loops available nationwide, CLECs are purchasing very few such loops. This is a further, strong indication that CLECs are able to serve the vast majority of their high-capacity customers with their own high-capacity facilities.

As shown in Table 2, CLECs have purchased only 72,000 high-capacity loops in the four Bell companies' regions combined. By comparison, CLECs have purchased approximately three million POTS loops in the BOC regions. *See* Figure 2. Virtually all of the high-capacity loops that CLECs have purchased are DS-1 loops. *See* Table 2 & Figure 2. CLECs have purchased only 140 DS-3 loops, and not a single loop above the DS-3 level. *See* Table 2.

Even the use of DS-1 loops is minuscule when viewed in relation to the number of lines that CLECs serve using their own loop facilities. CLECs have obtained approximately 72,000 unbundled DS-1 loops, while they are serving at least 12.5 million lines (and likely closer to 20 million) using their own loops. *See* Table 3; *see also* Table 1, *supra.*

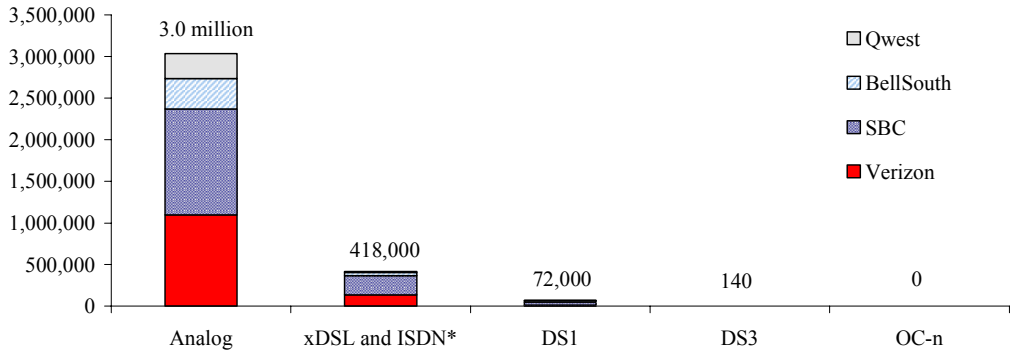
Table 2. Use of High-Capacity Loop UNEs

	High-Capacity Loops Purchased by CLECs					
	DS-1		DS-3		OC-3 or Higher	
	Total	% of all loops	Total	% of all loops	Total	% of all loops
Verizon	12,300	1%	60	0.005%	0	0%
SBC*	36,500	2%	70	0.004%	0	0%
BellSouth	18,600	4%	10	0.003%	0	0%
Qwest	4,700	2%	0	0%	0	0%
Total	**72,000**	**2%**	**140**	**0.004%**	**0**	**0%**

*Does not include Connecticut.

[32] *See, e.g.,* Wall Street Transcript Corp., Investext Rpt. No. 2003080, Analyst Interview: Telecommunications – Industry Report at *4 (Sept. 22, 2000) ("The capital efficiency of fixed wireless technology is attractive relative to the cost of deploying fiber connectivity to customer buildings. . . . fixed wireless technology lowers last-mile capital costs considerably.") (quoting Trent Spiridellis, Banc of America Telecommunications Analyst); W. Schaff, *Taking Stock: No Strings Attached*, Information Week (Feb. 22, 1999) ("Nextlink . . . has been concentrating on building fiber-optic connections to large offices and business parks. . . . Nextlink, however, intends to use the wireless system as a way to get to market faster. Once it has established service to a given location, it will build a fiber-optic connection to that location and relocate the radio equipment to another building."); WinStar Press Release, *IDT Corp. Announces the Acquisition of WinStar Communications, Inc.* (Dec. 20, 2001) ("WinStar's fixed wireless technology offers a solid last mile solution and is a great fit with IDT's long distance services and extensive fiber assets.").

Figure 2. Unbundled Loops by Type



*ISDN, HDSL, and IDSL loop volumes for Verizon are included in analog loop data.

Table 3. Use of High-Capacity Loop UNEs vs. Use of Self-Provided Loop
CLEC-Provided Loops = E911 Listings – Total Unbundled Loops

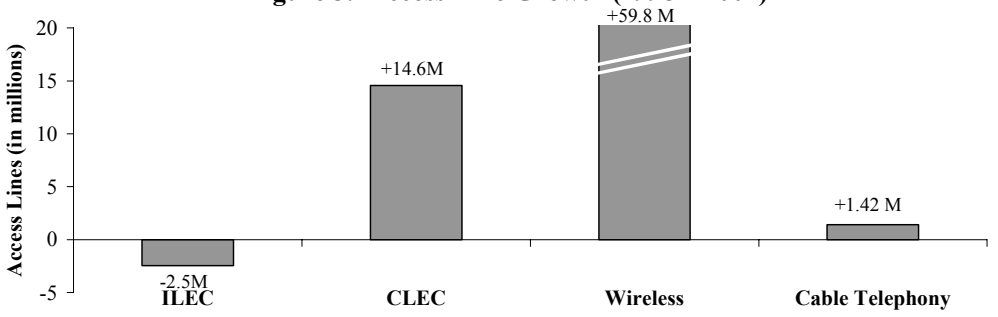
State	DS-1 Loops	CLEC-Provided Loops	State	DS-1 Loops	CLEC-Provided Loops
Alabama	1,200	116,000	Nevada	320	19,000
Arizona	270	517,000	New Hampshire	540	66,000
Arkansas	1,100	41,000	New Jersey	480	334,000
California	14,000	1,604,000	New Mexico	2	18,000
Colorado	240	571,000	New York	2,600	1,120,000
Delaware	660	12,000	North Carolina	2,600	179,000
Florida	3,900	482,000	North Dakota	50	5,800
Georgia	2,300	509,000	Ohio	1,600	207,000
Idaho	10	32,000	Oklahoma	790	100,000
Illinois	970	908,000	Oregon	1,300	332,000
Indiana	400	141,000	Pennsylvania	3,500	608,000
Iowa	7	45,000	Rhode Island	330	71,000
Kansas	1,500	24,000	South Carolina	1,900	79,000
Kentucky	470	30,000	South Dakota	20	31,000
Louisiana	3,000	103,000	Tennessee	2,900	214,000
Maine	190	(2,300)	Texas	9,300	500,000
Maryland	490	256,000	Utah	120	258,000
Massachusetts	1,700	733,000	Vermont	20	4,200
Michigan	1,700	260,000	Virginia	1,100	431,000
Minnesota	620	477,000	Washington	2,000	645,000
Mississippi	390	16,000	Washington, D.C.	100	145,000
Missouri	2,800	145,000	West Virginia	290	(6,000)
Montana	30	5,100	Wisconsin	1,600	173,000
Nebraska	5	114,000	Wyoming	1	(250)
			Total	**72,000**	**12.5 million**

Data do not include the former GTE service area and Connecticut.

B. POTS Loops.

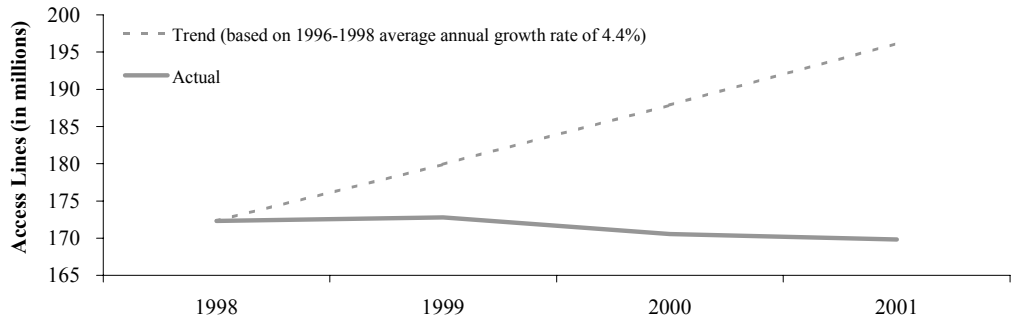
Technologies that compete directly against traditional POTS loops are rapidly being deployed across the country. Today, ILECs are losing about as many lines to wireless and cable networks as they are to wireline CLECs.[33] The number of lines served by ILECs has declined for the last three years running – a trend never witnessed before in a century of telephone service.[34] *See* Figure 3. And the trend is all the more dramatic given the year-over-year growth that ILECs have historically experienced. *See* Figure 4.

Figure 3. Access Line Growth (1998 – 2001)



Sources: Credit Suisse First Boston, JP Morgan H&Q, Kinetic Strategies, and NCTA. *See* Appendix M.

Figure 4. Decline of BOC Access Lines



Sources: Credit Suisse First Boston; FCC. *See* Appendix M.

[33] *See*, *e.g.*, R. Chopra, *et al*., Deutsche Banc Alex. Brown, *Competitive Local Exchange Carriers (CLECs)* at 9 (Jan. 15, 2002) (estimating that SBC has lost an equal number of lines to CLECs and "technological substitution"); *Gartner U.S. Residential Wireline Report* at 5 ("A number of key factors contribute to this decline [in ILEC lines]: residential dial tone competition and customer adoption of new modes of communications that effectively displace 100-year-old-telephone technology."); *see also JP Morgan Telecom Services 2001 Report* at 41.

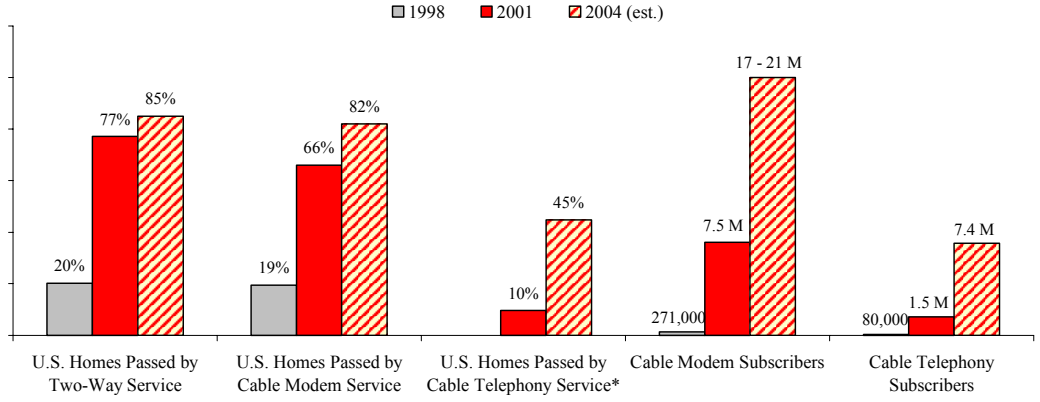
[34] ILEC end user lines declined from 181 million in December of 1999, to 179 million in June of 2000, to 177 million in December of 2000, and 174 million in June of 2001. *See FCC Local Competition Report, Feb. 2002 ed.* at Table 1; *see also Gartner U.S. Residential Wireline Report* at 5 ("With the release of second quarter 2001 financial and operational results, these incumbent providers (Verizon, SBC, BellSouth, Qwest) reported aggregate reductions in the number of residence access lines served within their territories, resulting in a 1.8 percent year-over-year decline and a 0.9 percent quarter-over-quarter sequential decline."); S. Flannery, *et al.*, Morgan Stanley, Dean Witter, Telecom – Wireline: Telecom Trend Tracker: Defense is Best Strategy at Exh. 2 (Aug. 17, 2001) (Year-over-year, Verizon, SBC and BellSouth had drops in access lines of 0.4 percent, 1.1 percent, and 0.8 percent, respectively, from 2Q00 to 2Q01).

1. Cable Networks as Substitutes for ILEC Loops.

Congress anticipated the emergence of cable/telephone competition in 1996.[35] In its 1999 *UNE Remand Order*, however, the Commission was not yet ready to conclude that cable offered a viable alternative to ILEC loops, because service was still "largely restricted to residential subscribers, and [cable] generally supports only one-way service, not the two-way communications telephony requires."[36] As of year-end 1998, cable operators offered two-way capabilities to only about 20 percent of all homes (*i.e.*, to no more than 20 percent of the homes that cable served).[37]

In the past three years, cable operators have added two-way capabilities to almost all of their networks, using a hybrid-coax-fiber (HFC) architecture. *See* Figure 5. Cable operators now offer two-way capabilities to approximately 77 percent of all homes (approximately 82 percent of homes passed by cable).[38] Two-way capabilities are expected to reach 85 percent of all homes by 2004.[39] Although they depend on many of the same upgrades to the cable network,[40] these two-way capabilities have been implemented as two distinct services – (1) cable telephony, and (2) high-speed cable modem service.

Figure 5. Growth of Cable as a Voice and Data Competitor



* Data on U.S. homes passed by cable telephony in 1998 were unavailable.

Sources: See Appendix M.

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[35] *See* Senate Conference Report 104-230, *Telecommunications Act of 1996* at 148, 104th Congress, 2nd Session (Feb. 1, 1996).

[36] *UNE Remand Order* ¶ 189.

[37] *See UNE Fact Report* at III-20 & n.54.

[38] *See Broadband 2001* at Table 6.

[39] *See id.*

[40] *See NCTA Cable Telephony Report* at 1 ("[T]he same upgrades that allow cable companies to offer high-speed Internet access and digital cable service help make it possible for cable to provide high-quality digital telephone service.").

As discussed in Section II.A.2, at least five cable operators have actually deployed commercial circuit-switched cable telephony. These cable operators currently offer circuit-switched telephony services to about 10 million U.S. homes – approximately 10 percent of all homes – in 20 states.[41] In some states, cable telephony is far more widely available than that.[42] For example, Cox offers service to nearly all of the one million homes in Rhode Island, and AT&T offers cable telephony services to a large and increasing share of the nearly three million homes its cable network passes in the Boston Area, the approximately 600,000 homes it passes in the Pittsburgh area, the 3.5 million homes it passes in the Chicago area, and the 2.7 million homes it passes in the Bay Area.[43]

Nationwide, more than 1.5 million homes currently subscribe to cable telephony,[44] and 70,000 new subscribers are being added every month.[45] There are currently two major cable operators – AT&T and Cox – that are actively deploying circuit-switched cable telephony throughout their cable systems.[46] And as a result of its proposed merger with AT&T, Comcast plans soon to deploy cable telephony to about one million homes.[47]

With HFC in place,[48] cable plant can be adapted to provide bare bones switched phone service for about $800 to $825 per line.[49] This is the cost for providing "primary line" telephone

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[41] *See JP Morgan Cable Industry Report* at Table 22; *NCTA Cable Telephony Report* at 2.

[42] *See*, *e.g.*, *Rhode Island Order* ¶ 105 ("Cox has the capability to provide cable telephony service to 75 to 95 percent of Rhode Island customers.").

[43] *See* Section II.A.2, notes 37-39.

[44] *See* NCTA, *US Cable Telephony Subscribers (in Thousands): 1998-2001*, http://www.ncta.com/industry_overview/indStats.cfm?statID=13.

[45] *See NCTA Cable Telephony Report* at 1.

[46] *See* Section II.A.2, notes 37-39.

[47] *See* Applications and Public Interest Statement of AT&T Corp. and Comcast Corporation at 38, *Application for Consent to the Transfer of Control of Licenses, Comcast Corporation and AT&T Corp., Transferors, to AT&T Comcast Corporation, Transferee*, MB Docket No. 02-70 (FCC filed Feb. 28, 2002) ("Comcast President (and AT&T Comcast CEO) Brian L. Roberts has announced that the merged company intends to begin to deploy telephone service in the Philadelphia and Detroit markets currently served by Comcast, after closing, bringing facilities-based local telephone choice to about one million additional homes.").

[48] *Broadband 2001* at 39 ("In addition to high-speed Internet and other high-bandwidth applications, new HFC networks can support telephony service over the cable plant.").

[49] *See*, *e.g.*, JP *Morgan Cable Industry Report* at 51-52 (about $375 per line for the actual equipment, another $125-$150 for the labor, and $300 for customer premises equipment); AT&T Broadband, *Investor Presentation* at 37 (July 2001) ($825 per line); *NCTA Cable Telephony Report* at 10 ("Cox, which has installed 11 switches in its largest markets, estimates its switching costs at $105 per customer (assuming a penetration rate of 25 per cent of homes passed and an average take-rate of 1.5 lines per customer). In addition, Cox spends and additional $505 per customer for the Network Interface Unit (NIU), the drop, the tap and the Headend Interface Terminal (HIT). This combined variable cost of $610 per customer for the provision of local telephony is in addition to the $220 per home passed that Cox must invest to upgrade its cable plant to 750 MHz capacity and to introduce two-way interactivity. It also does not include the $100 per customer that Cox is investing to power its cable networks to ensure that telephone service continues in the event of a power failure.").

service.[50] Cable telephony systems use the same, commercial, circuit switches and perform all the same functions as ILEC POTS services.

The imminent deployment of IP cable telephony will further accelerate the availability of cable networks as a competitive substitute for ILEC voice loops. As described in Section II.B, each of the major cable operators is now conducting trials of IP cable telephony, or has indicated plans to do so. Commercial deployment of the service as a secondary-line service is expected to begin within the next year or so;[51] there are expected to be between five and seven million cable IP telephony subscribers by 2006.[52] Cable operators are expected to deploy primary-line IP cable telephony service shortly thereafter.[53]

Cable operators also provides high-speed Internet access services, which compete directly with ILEC loops that have been used mainly for connecting to the Internet. In the past, many customers bought second phone lines for their computers, to support dial-up Internet connection. Second-line usage peaked in 1999, when approximately 27.5 percent of all households were buying second lines,[54] which they used mainly as dedicated data lines.[55]

Many of those same households are now buying broadband connections instead, and about two out of three of those connections are over cable.[56] As of year-end 1998, cable modem service was available to approximately 20 million homes, or roughly 20 percent of the U.S. mass market,[57] and there were approximately 500,000 cable modem subscribers.[58] Today, the service

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[50] *See*, *Broadband 2001* at 40; *see also* AT&T Broadband, *Investor Presentation* at 35 (July 2001) ("Primary line creates maximum market opportunity: 5-10X greater voice revenue per customer; 7-8X greater cash flow per customer; Less than 10% additional upgrade and rebuild capital required.").

[51] *See*, *e.g.*, R.A. Bilotti, Morgan Stanley, Dean Witter, Investext Rpt No. 8202634, Cable: The Past Is Prologue to the Future – Industry Report at *5 (Oct. 5, 2001) ("We expect the cable operators to begin offering IP telephony in 2002/2003"); M. Paxton, Senior Analyst, Cahners In-Stat, *Cable Telephony – Moving Slowly But Surely*, CED (Jan. 2002), http://www.cedmagazine.com/ced/2002/0102/id6.htm ("most [MSOs awaiting IP telephony] remain confident that by late 2002/early 2003, cable telephony will be an important part of their service menu").

[52] *See*, *e.g.*, *Forrester Sizing US Consumer Telecom Report* at 10-12 ("[B]y 2006, [cable companies] will reap the rewards of conversion to IP – an increased set of offerings at lowered costs – in the form of 4.8 million new packet lines.); *Strategis Group U.S. IP Cable Telephony Report* at Table 3.9 (predicting 7.36 million IP telephony lines by 2006).

[53] *See*, *e.g.*, *JP Morgan Cable Industry Report* at 46 ("we suspect that most MSOs will deploy primary-line IP voice in 2004 or 2005"); *Strategis Group U.S. IP Cable Telephony Report* at 53 ("The majority of cable telephony subscribers will be lifeline IP users, and deployments are expected to ramp up considerably in 2004 and 2005."); *id.* at Table 3.9 (predicting 2.15 million lifeline IP cable telephony customers in 2004).

[54] *FCC Trends in Telephone Service, Aug. 2001 ed.* at Table 8.4 (28.6 million households with second lines in 1999); U.S. Dep't of Commerce, *USA Statistics in Brief* (2001) (103.9 million US households in 1999); (28.6 million/103.9 million = 27.5% of homes with second lines).

[55] *See*, *e.g.*, C.J. Lane, *Out of Line*, Tampa Trib. at 1 (Aug. 13, 2000) (citing Yankee Group study finding that approximately 60 percent of households with second lines use them for Internet access.).

[56] *Morgan Stanley Cable Modem/xDSL Report* at Exh. 3; *TeleChoice DSL Deployment Summary*.

[57] *See UNE Fact Report* at III-21 & n.61.

[58] *See* NCTA, *US Cable Modem Subscribers: 1998-2001*, http://www.ncta.com/industry_overview/indStats.cfm?statID=15.

is available to between two-thirds and three-quarters of all U.S. homes,[59] and approximately 7.5 million homes subscribe.[60] One respected analyst now predicts that cable "will capture around 65% of the secondary line market by 2006."[61]

2. Mobile Wireless as Substitute for POTS Loops.

At the time of the *UNE Remand Order*, the Commission concluded that wireless phones did not yet offer a sufficiently robust competitive alternative to ILEC loops to justify any cut back on availability of the loop UNE.[62] Wireless service areas were less ubiquitous; they did not offer the same functionality; their data capabilities were "generally inferior;" and their sound quality was not always as good.[63] Wireless links offered "promising" but "not yet viable alternatives" to wireline loops.[64]

As discussed in more detail in Section II.C, conditions have changed significantly since that time. Independent experts now almost uniformly conclude that wireless is a significant competitive substitute for second-line service today.[65] For example, IDC found that, as of year-end 2001, "10 million wireline access lines will have been displaced by wireless, primarily by consumers choosing wireless service over installing an additional access line at home."[66] IDC estimates that, by 2005, wireless phones will replace 30 to 35 percent of second and additional wireline access lines.[67] Many other independent analysts have reached similar conclusions.[68]

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[59] *See Morgan Stanley Cable Modem/xDSL Report* at Exh. 3 (estimating 75 million homes passed by cable modem service as of year-end 2001); *JP Morgan Telecom Services 2001 Report* at Table 15 (estimating 106.4 million US households as of year-end 2001) (74.92/106.4 = 70.4 percent of US homes passed by cable modem service); *see also NCTA Industry Statistics* (70 million homes passed by cable modem service as of November 2001); *Yankee Group Consumer Broadband Report* at 4 ("At year-end 2001, approximately 66% of the households in the United States will have cable modem service available to them."); *Broadband 2001* at Table 6.

[60] *See Morgan Stanley Cable Modem/xDSL Report* at Exh. 3.

[61] *JP Morgan Cable Industry Report* at 53.

[62] *UNE Remand Order* ¶ 188.

[63] *Id.*

[64] *Id.*

[65] Wireless service also clearly competes directly, today, against wireline payphone service and other wireline services used outside the home and regular office – hotel phones, for example. *See*, *e.g.*, *Sixth CMRS Report* at 32 & n.211; Michael Powell, Chairman, FCC, *Question and Answer with Chairman Powell*, remarks before the Forrester Research Telecom Forum (May 21, 2001) ("I haven't picked up the phone in a hotel in five years, because I use my wireless phone.").

[66] *IDC Wireless Displacement Report* at 1; *see also Zacks All-Star Analyst Issues Recommendations for 5 Stocks*, PR Newswire (Nov. 15, 2001) (Drake Johnstone, Davenport & Co.: "[C]onsumers are using their wireless phone line as a second phone line."); T. Fowler, *The Low Cost of Going Wireless; More Callers Cut Cords As Cell Phone Rates Fall*, Houston Chronicle (Aug. 8, 2001) ("Many [people] are using [wireless phones] as replacements for second lines in their homes.").

[67] *See IDC Wireless Displacement Report* at Figure 15.

[68] *See*, *e.g.*, *Forrester Sizing US Consumer Telecom Report* at 9 ("Over the next five years, the mobile business will take a cut at fixed-line revenues. Wireless operators will ravage the fixed-line business as 5.5 million customers give up secondary lines."); *JP Morgan Telecom Services 2001 Report* at Table 26 (By 2006, over 2.8 million

Wireless is now becoming increasingly competitive with primary line wireline services as well. A Yankee Group survey in early 2001 found that about 3 percent of wireless subscribers had now abandoned wireline in favor of wireless entirely.[69] A wireless industry association has estimated that the number as of that date "could be as high as 5 percent."[70] A recent *USA Today*/CNN/Gallup poll found that 18 percent of cell phone users "use cell phones as their primary phones."[71]

Many wireless carriers are now marketing their services as direct substitutes for wireline service. The Commission's *Sixth CMRS Report*, for example, describes the Cricket service offered by Leap Wireless – a service offered "at a flat rate, paid in advance each month," in order to be "competitive with traditional landline service."[72] As noted by one industry publication, the Cricket business model "has been successful enough that several regional carriers have started offering their subscribers 'Leap-alike' plans," including ALLTEL's "Boomerang," US Unwired's "Freedom Plan," and Dobson Cellular's Cellular One "Breeze" service.[73] VoiceStream's advertisements exhort customers to abandon their wireline phones,[74] and the company's CEO states that they "view wireless as a replacement for wireline."[75]

So far as service quality is concerned, wireless is now fully competitive with wireline – and better than competitive in one key respect. In almost all major markets, wireless carriers now offer digital calls with connection quality comparable to the quality of wireline service,[76]

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people will have substituted a wireless phone for a secondary line.); *Gartner U.S. Residential Wireline Report* at 11 ("Of all households reporting a residence access line replacement over the past six months, 2.3 million or 33 percent of lines were replaced with a cellular/PCS phone.").

[69] *Sixth CMRS Report* at 32 (citing Yankee Group survey cited in J. Sarles, *Wireless Users Hanging Up On Landline Phones*, Nashville Bus. J. (Feb. 2, 2001)).

[70] *Id.* at 32, n.207 (citing *Consumers Replacing Landline Phones with Wireless*, Knight Ridder/Trib. Bus. News (Jan. 10, 2001).

[71] M. Kessler, *18% See Cell Phones as Their Main Phones*, USA Today (Jan. 31, 2002).

[72] *Sixth CMRS Report* at 33-34; Leap Wireless, *Investor Relations*, http://www.leapwireless.com/cindex.html.

[73] *See* D. Mendez-Wilson, *Cricket Copycats on the Make; 'Leap-Alike' Services Hop into Markets Across the Country*, Wireless Week at 24 (Aug. 20, 2001).

[74] *See*, *e.g.*, R. Saunders, *Don't Kill the Catalyst for Telecom Competition*, Milwaukee Bus. J. (Nov. 16, 2001), http://Milwaukee.bizjournals.com/Milwaukee/stories/2001/11/19/editorial3.html ("VoiceStream Wireless, which provides service in the Milwaukee area, has launched a TV advertising campaign on ways to use your wireless phone for purposes other than conversations with friends and loved ones. One commercial shows a woman using her phone as a meat tenderizer, while another ad suggests that the phone makes a good chew toy for your Labrador retriever. The message is simple: Cellular calling plans are so cheap that you don't need the local or long-distance phone company anymore.").

[75] E. Mooney, *VoiceStream Prepares for Transnational Race for Customers*, Radio Comm. Report (Apr. 10, 2000); *see also* AT&T Wireless and VoiceStream Wireless Petition for Declaratory Ruling at 3, *Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, CC Docket No. 96-98 (FCC filed Nov. 19, 2001) ("CMRS providers offer true facilities-based competitive alternatives to incumbent LECs. Increasingly, they are viewed as full-fledged competitors of landline carriers in the provision of telephone exchange service.").

[76] *See* Telephia, *Wireless Network Performance in the U.S. Metro Areas* (July 2001) ("A comprehensive study undertaken by Telephia from data collected from November 1999 to April 2001 concluded that 'wireless customers receive a high level of service in both core and suburban areas . . . Wireless customers on average can place, hold, and complete a call of acceptable audio quality 96-99 percent of the time.'").

and in some respects (*e.g.*, operator services) often superior. Nearly 80 percent of wireless customers now subscribe to high-quality digital service;[77] dial-up wireline service, by contrast, remains overwhelmingly analog.[78] The rate of busy circuits and dropped calls on wireless networks is improving rapidly.[79] Wireless E911 location capability is now virtually the same as wireline capability, and it is being rapidly deployed.[80] And wireless service is unambiguously superior to wireline in that the wireless phone is mobile. Mobility is, self evidently, a very valuable feature, and one that has historically commanded a high price premium in the market.

Wireless is now price competitive with wireline services, particularly when the comparison is made between equivalent bundles of service. The typical wireline customer purchases not only basic local service, but also long-distance service and some number of value-added features like call waiting, voice mail, or caller ID.[81] Wireless carriers typically provide all of these add-on services, and often for no extra charge.[82] Taking into account the whole package of service most typically sold, a November 2001 Gartner Dataquest study accordingly concludes that wireless calling prices are already "competitive with, and in some case better than, wireline calling rates."[83] And wireless prices continue to decline rapidly – by as much as 10 to 20 percent a year in recent years.[84]

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[77] *See*, *e.g.*, Dr. Robert F. Roche, CTIA, *Measuring Wireless Today*, http://wireless.fcc.gov/services/cmrs/presentations/Bob_Roche_Feb_28_FCC_presentation.pdf (showing approximately 25 million analog subscribers as of June 2001, compared to about 100 million digital subscribers); *see also Sixth CMRS Report* at 6 ("[A]t the end of 2000, digital customers made up 62 percent of the industry total, up from 51 percent at the end of 1999 and 30 percent two years ago.").

[78] *See FCC Statistics of Common Carriers, 2000/2001 ed.* at Table 2.3 (162 million analog switched access lines compared to 10 million digital lines).

[79] *See*, *e.g.*, *Gartner U.S. Residential Wireline Report* at 11 ("It is only over the last year that there has been a measurable shift by consumers to replace their wireline access lines with the cellular/PCS alternative – clearly an indication that cellular/PCS has overcome the quality and reliability weakness in the mind of the consumer."); AARP, *Understanding Consumer Use of Wireless Telephone Service*, http://research.aarp.org/consume/d17328_wireless_1.html. ("Wireless telephones are becoming more popular in the United States as the cost has become more affordable and the quality of wireless service has improved.").

[80] *See*, *e.g.*, Thomas J. Sugrue, Prepared Testimony before the Subcommittee on Communications, Committee on Commerce, Science, and Transportation, United States Senate, at 6 (Oct. 16, 2001) ("Wireless location technology is available, is being deployed in networks and handsets, and is capable of accurately locating 911 callers." By October 2002, "the location of 911 calls will be reported in most instances with an accuracy of 100 meters or less. Network equipment and handsets with location capability are now being manufactured and sold to meet and exceed this benchmark.").

[81] *See*, *e.g.*, *JP Morgan Cable Industry Report* at 50 (the average voice customer generates approximately $58 in monthly revenues, only $18 of which is for basic local service; the average revenue generated for vertical features is nearly $5, and the average revenue generated in access charges is about $5.50).

[82] *See*, *e.g.*, Sprint PCS, *Sprint PCS Wireless Service Plans*, http://www1.sprintpcs.com/explore/servicePlans OptionsV2/PlansOptions.jsp (All Sprint PCS service plans include voicemail, call waiting, caller ID, numeric paging, and three way calling.); VoiceStream, *Products and Services, Rate Plans*, http://www.voicestream.com/products/services/rateplans/dc_balt.asp (all VoiceStream plans include voicemail, call waiting, caller ID, built-in paging, and conference calling).

[83] *Gartner U.S. Consumer Telecommunications and Online Market Report* at 33.

[84] *See*, *e.g.*, *Sixth CMRS Report* at 6.

3. Direct Competitive Overbuild of ILEC Loops.

A number of CLECs are now building their own all-new loop facilities to serve residential customers. The business plans of these CLECs typically involve the provision of service to one small geographic area at a time – anywhere from a single apartment building to a small cluster of homes. They also often involve the deployment of facilities that enable the provision of more than just basic voice service, but video and broadband Internet services as well.

A number of smaller incumbent local exchange carriers have established CLEC affiliates in order to "target RBOC markers that are geographically proximate to their existing ILEC holdings."[85] *See* Table 4. This geographic "edge-out" strategy enables the CLEC "to take advantage of the synergy of its ILEC and CLEC operations while entering typically underserved non-urban markets."[86] The CLEC may, for example, "leverage the excess capacity on [its] existing plant to reduce startup and entry costs."[87] In many cases, such CLECs will "begin marketing mobile wireless service in new markets before their entry into the competitive market," so that when they "enter the new wireline markets, customers are already familiar with their reputation and quality of service, providing the [CLEC] with significant competitive advantage."[88]

Another overbuild strategy involves the deployment of a broadband pipe (generally either hybrid fiber coax or pure fiber) to provision high-speed bundled service offerings to individual neighborhoods or the approximately 30-35 percent of the population that live in multi-dwelling units. *See* Table 5.[89] Several CLEC affiliates of incumbent LECs – including PennTel and Hickory Tech – have taken this approach.[90] This also has been the strategy of RCN, which has been "constructing advanced networks in select markets with high levels of population density and favorable demographics along the West and East Coasts, along with Chicago." [91] In the fourth quarter of 2001 alone, RCN added nearly 47,000 new subscriber connections (including

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[85] *NPRG CIOC Report 2001*, Ch. 2 at 1.

[86] *Id.*

[87] *Id.*, Ch. 4 at 1.

[88] *Id.*, Ch. 4 at 1-2.

[89] *See*, *e.g.*, Robert Currey, Vice Chairman, RCN Corporation, Prepared Testimony before the Senate Subcommittee on Antitrust, Business Rights, and Competition, Committee on the Judiciary, *Cable and Video: Competitive Choices*, Federal News Service (Apr. 4, 2001) ("About 30-35 percent of the population lives in multiple dwelling units (MDUs), such as apartments, cooperatives or condominiums.").

[90] *NPRG CIOC Report 2001*, Ch. 4 at 2.

[91] K. Hoexter, Merrill Lynch Capital Markets, Investext Rpt No. 8232380, RCN Corp. – Company Report at *2 (Oct. 24, 2001).

about 16,000 voice connections) to its network.[92] In the approximately four years since it began the process, RCN has built out is network to pass more than 1.5 million homes.[93]

In addition to overbuilding ILEC networks, some CLECs are pursuing a "greenfield" strategy, which involves deploying facilities in brand-new developments where there is no incumbent provider. For example, in its "Greenfield markets" in Charlotte and Raleigh, CTC deploys "our own remote switching equipment, as well as build a distribution system to in effect, become the local telephone company for each new development."[94] CTC is "working with developers and builders to become the 'official telecommunications provider' for their developments."[95] The company states that, "[b]y clustering our projects, we are able to gain capital and service efficiencies."[96] As of September 2001, CTC was "adding about 1,000 CLEC lines a month."[97] Another CLEC – BTI – is targeting new "residential developments," and was awarded a major contract for a large development in Chapel Hill that includes "three schools, a 500-acre commercial tract and 4,000 homes."[98]

Table 4. CLEC Operations of Non-Bell Company ILECs

Carriers	CLEC Operations
ALLTEL Communications	"ALLTEL has been successfully utilizing its wireless brand recognition to expand its CLEC operations into areas within its wireless footprint." "In the markets that have been operational the longest, Little Rock, AR, and Charlotte, NC, the Company has achieved 50% and 8% penetration, respectively."
Blackfoot Tel. Coop.	"Blackfoot is anticipating significant growth and is expending $7 million to build out its infrastructure."
CEI Networks	"CEI plans to expand service via an edge out strategy once it has fully deployed HFC to its initial markets in 2002."
Century Tel	"The Company is currently offering CLEC services to residential and small and medium sized business customers in Shreveport and Monroe, LA. CenturyTel will employ 'edge-out' strategy for its CLEC expansion. . . . CenturyTel has budgeted more than $20 million of its 2001 capital expenditures to support this expansion."
CTC Exchange Services	"In 1998, CT Communications began offering CLEC service in markets contiguous to its ILEC market. . . . The CLEC offers services similar to those offered by the ILEC by offering facilities based services while leveraging existing back office and billing operations of its parent."
CTC Telcom	"CTC Telcom is currently serving over 7,000 CLEC access lines in the communities of Barron, Rice Lake, and Chetek, WI. Each of its CLEC markets is adjacent to its parent company's ILEC exchanges."
CTS Telecom d/b/a Climax Tel. Co.	"The Company started offering CLEC services in 1997 to businesses in Battle Creek, Kalamazoo, Galesburg, and Scotts, MI. The CTS network employs a Lucent 5ESS 2000 switch."

[92] RCN Press Release, *RCN Announces Fourth Quarter and Year-End 2001 Results* (Feb. 8, 2002); *id.* (in 4Q01 RCN "added over 43,000 marketable homes to its broadband footprint, and is now selling multiple services to over 1.5 million homes.").

[93] *Id.*

[94] CT Communications, Form 10-K/A at 5 (SEC filed Dec. 19, 2001).

[95] *Id.* at 1; *see also* J. Engebretson, *Edging Out the Incumbent*, America's Network (Sept. 1, 2001) (CTC's "green-field business had its genesis in a project it did with the Mills Corp., a real estate investment trust that builds shopping malls nationwide. CT won the contract to provide phone service to a new mall Mills was building in BellSouth territory. It now serves every business in the mall. It also has won similar contracts for other new construction projects with Mills and other companies.").

[96] CT Communications, Form 10-K/A at 1 (SEC filed Dec. 19, 2001).

[97] J. Engebretson, *Edging Out the Incumbent*, America's Network (Sept. 1, 2001).

[98] BTI Press Release, *Meadowmont Selects BTI as Preferred Telecommunications Provider for Residents* (Mar. 31, 2000).

Table 4. CLEC Operations of Non-Bell Company ILECs	
Carriers	**CLEC Operations**
CTSI	Operates CLEC networks in Wilkes-Barre/Scranton/Hazelton; Harrisburg; and Lancaster/Reading/York, PA. "CTSI serves 94% of its access lines by its own switches and 45% of access lines are served solely by the CTSI network."
ExOp of Missouri	"ExOp currently offers a variety of services to the population of 5,000 in Kearney, a city just outside of Kansas City, MO." "Through the partnership with UtiliCorp, ExOp is expanding its fiber network and service offerings. . . into the rural communities that make up UtiliCorp's energy service territory."
Fidelity Comm. Services (FCS)	FCS began offering CLEC services in Rolla, MO in March 2001. "FCS is serving business and residential customers in Rolla from its Lucent 5ESS Class Five switch located in Sullivan, MO."
Goldfield Access Network (GAN)	"GAN is pursuing an edge-out strategy in offering its services to businesses in nearby communities where the Goldfield name has brand recognition."
Heart of Iowa Communications	"Heart of Iowa began CLEC operations in August 1998. The Company employed an 'edge-out' strategy and targeted markets adjacent to those in which it was offering ILEC services. Heart of Iowa is currently serving its CLEC markets from its single Siemens' EWSD switch."
HickoryTech	"The Company used an overbuild strategy, installing its network next to the existing US West network and laying wire directly next to residents' homes." "HickoryTech uses a host switch that is owned by its sister company and ILEC, Mankato Citizens Telephone Company. HickoryTech deploys remote switches in the markets it serves."
HTC Communications	"HTC began offering CLEC services in 1998. The Company is currently operating its CLEC business in two of its ILEC exchanges, Myrtle Beach and Conway, SC."
Mid-Maine Communications	"In 2000, Mid-Maine began operating as a CLEC in several communities in Maine. By the end of the year, the Company had expanded into 12 markets." "Mid-Maine currently offers local dial tone and DSL to business and residential customers in Auburn, Augusta, Bangor, Brewer, Ellsworth, Lewiston, Portland, and Waterville."
Mid Rivers Communications	"Mid-Rivers Communications, offers competitive telephone services to several Tier Three, Four, and Five markets, adjacent to its parent's ILEC markets, in Montana and a small portion of North Dakota. . . . Mid-River Communications serves its CLEC exchanges from its Siemens EWSD Class Five switch which is installed in Mid-Rivers' Central Offices located in Glendive, MT."
Nex-Tech	The CLEC subsidiary of Rural Telephone in Kansas is "is targeting and capturing new CLEC communities" served by SWBT
NTELOS	"NTELOS enters markets that are physically proximate to its existing ILEC operations and uses its brand and existing infrastructure to expand into them." "Wireless is marketed strongly to small and medium-sized business to gain brand recognition and trust. NTELOS later approaches these same customers to offer them CLEC service for their businesses."
Otter Tail	"Otter Tail began offering local switched service in January 1999 and currently serves four markets in Minnesota."
Panhandle Telecom. Systems	"PTSI began offering CLEC services in Perryton, TX in January 2001 . . . The Company is currently offering competitive services from its Nortel DMS-100 host switch located in Guymon, OK."
Penn Telecom (d/b/a Penntele.com)	"PTI employs an edge out strategy and has entered markets proximate to the footprint of North Pittsburgh Telephone Company." "While PTI has concentrated on small to medium-sized businesses, it is also experimenting with offering its bundled services in the two affluent suburbs of Perrysville and Sewickley."
Sharon Telephone Company	"The Company offers local phone and Internet services from its single Nortel DMS-10 switch in Sharon, WI, to the towns of Darien, WI, and Harvard, IL."
Silver Star Communications	"Silver Star Communications is currently offering competitive voice and data services in Afton, WY from its single Nortel DMS-10 switch."
TDS Metrocom	"TDS Metrocom serves three extended markets in Wisconsin, offering local dial tone, data, and Internet services to both business and residential customers."
Sources: See Appendix M.	

Table 5. Hybrid Fiber Coax (HFC) and Multi-Dwelling Unit (MDU) Providers	
RCN/Starpower	"About 30-35% of the total population lives in multiple dwelling units (MDUs), such as apartments, cooperatives or condominiums. The ability to serve this sector of the market is crucial because it is generally more profitable due to the large number of subscribers in each MDU."
Knology	Knology began operating in Montgomery, Ala., and targets towns with between 100,000 and 300,000 homes, including Augusta, Columbus, and West Point, Ga.; Huntsville and Montgomery, Ala.; Charleston, S.C.; and Panama City, Fla., and Knoxville, Tenn. Knology's network now passes 380,000 homes and 142,008 buildings. "Knology gained more than 30,000 MDU clients [in 2000] alone, a 27% increase from 1999."
MultiBand (Vicom)	"MultiBand . . . delivers local dial tone, long distance, satellite based digital cable television, and high speed internet services on one combined billing and delivery platform to residents of multi-dwelling properties."
Grande Communications	"Grande is building an advanced deep fiber broadband network that will deliver high-speed Internet, local and long-distance telephone and cable television service to homes, MDUs and businesses in the Austin/San Antonio corridor." "Grande's entire MDU portfolio . . . represents over 8,000 units."
Sources: See Appendix M.	

C. Broadband Loops.

Broadband services are provided over the telephone network using digital subscriber line (DSL) technology, which relies on the same local loop plant used to provide narrowband voice service.

DSL over ILEC loops is only one of four main last-mile technologies that is currently used to provide broadband services to mass-market consumers. The other three are cable modem, satellite, and fixed terrestrial wireless. Both consumers and providers view all four of these various broadband services as interchangeable. Two or more of the main broadband technologies are frequently available in the same geographic areas.

Cable is the clear leader in the broadband market today, by a wide and growing margin. Cable modem service is currently available to between two-thirds and three-quarters of U.S. households,[99] whereas DSL service is available to only about 45-50 percent.[100] *See* Table 6. As of the year-end 2001, there were approximately 7.5 million cable modem subscribers in the U.S., compared to 3.3 million residential DSL subscribers.[101] *See* Figure 6. According to analysts,

[99] *See Yankee Group Critical Mass Report* at Exh. 4; *Broadband 2001* at Table 6. *See also NCTA Industry Statistics* (as of November 2001, 70 million households were passed by cable modem service). The cable industry association estimates that, by year-end 2002, approximately 95 million U.S. homes (or nearly 90 percent of homes passed by cable) will have access to cable modem service. *See* NCTA, *Cable & Telecommunications Industry Overview 2001* at Chart 2 (2001) (citing Morgan Stanley, Dean Witter, *Broadband Cable Second-Quarter Review* at 9 (Aug. 29, 2001)).

[100] *See*, *e.g.*, *Yankee Group Critical Mass Report* at Exh. 4 (estimating that DSL will be available to 45 percent of all households by year-end 2001); *JP Morgan Cable Industry Report* at Figures 12 & 36 (DSL available to 43 percent of U.S. homes as of 1Q2001); P. Roche, *DSL Will Win Where It Matters*, McKinsey Quarterly 2001, No. 1 (2001) ("40 percent of all phone lines are ready for DSL").

[101] *See Morgan Stanley Cable Modem/xDSL Report* at Exh. 3 (cable modem); *TeleChoice DSL Deployment Summary* (residential DSL).

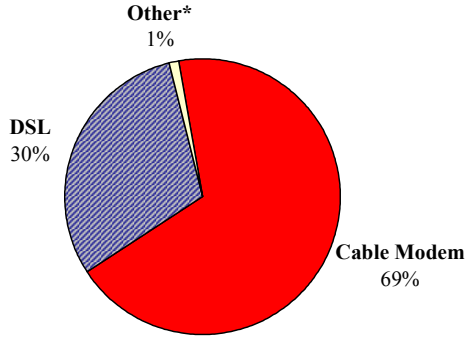
approximately one-third of all U.S. households currently have access to both cable modem and DSL service,[102] and approximately three-quarters of all homes with access to DSL also have access to cable modem service.[103]

Table 6. Availability of Broadband Services

	2001	2002	2003	2004	2005
Cable Modem					
McKinsey & Co. /JP Morgan	77%	81%	84%	85%	87%
Yankee Group	66%	77%	81%	82%	83%
DSL					
McKinsey & Co./JP Morgan	51%	60%	64%	70%	n/a
Yankee Group	45%	54%	62%	70%	74%
Satellite	50 states, covering over 90% of U.S. households				
Fixed Wireless	3%	n/a	n/a	n/a	41%

Sources: See Appendix M.

Figure 6. Market Share of Residential Broadband Subscribers YE 2001



*Satellite and fixed wireless.

Sources: Salomon Smith Barney, Morgan Stanley, Dean Witter, and TeleChoice. *See* Appendix M.

Cable is adding new subscribers at a faster rate than competing high-speed technologies. *See* Figure 7. And most analysts expect cable to maintain a considerable lead over DSL and other broadband technologies for the foreseeable future.[104] The principal reason is simply that

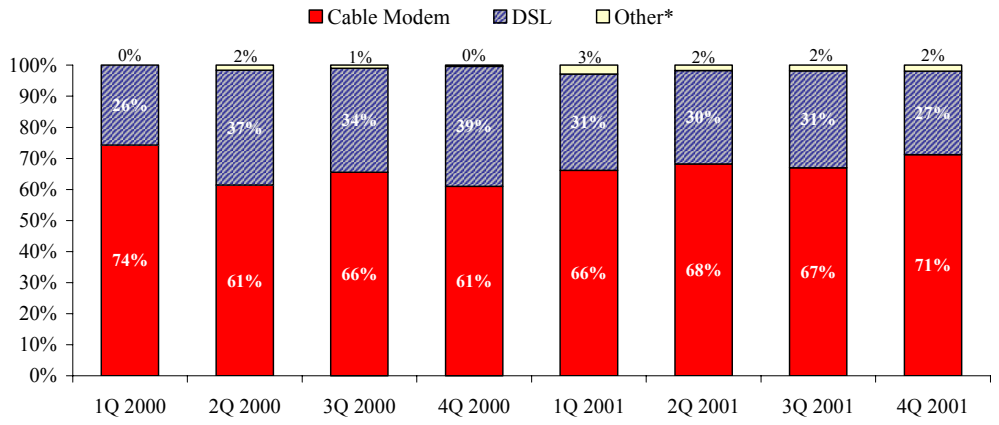
[102] *See*, *e.g.*, JP *Morgan Cable Industry Report* at Figures 12 & 36; *Broadband 2001* at Chart 25.

[103] *See*, *e.g.*, *JP Morgan Cable Industry Report* at Figures 12 & 36 (JP Morgan estimates that as of 1Q 2001, 10 percent of households had access to DSL only, and 33 percent had a choice of DSL or cable; therefore, approximately one-quarter of households with access to DSL did not have access to cable (10/43=23.3)).

[104] *See*, *e.g.*, *Broadband 2001* at Table 9 (estimating that by 2005, cable will have 51 percent of broadband subscribers, while DSL will have 37 percent.); *Yankee Group Consumer Broadband Report* at Chart 1 (predicting that by 2005, cable will have 48.5 percent of high-speed users, while DSL will have 33.8 percent); *Salomon Smith Barney Battle for High-Speed Data Report* at 1 (cable will account for 59 percent of subscribers and DSL will account for 34 percent in 2005); M. Pastore, *High Speed Access to Pass Dial-Up in 2005*, Cyberatlas (Jan. 22, 2001), http://cyberatlas.internet.com/markets/broadband/article/0,1323,10099_567101,00.html (citing Strategis Group Study

cable modem service is more widely available than DSL.[105] While analysts expect the gap between cable and DSL to narrow somewhat, it is expected that by 2005, cable will still reach 12 to 15 percent more homes than DSL will reach by that time. *See* Table 6.[106]

Figure 7. Market Share of New Residential Broadband Subscribers



*Satellite and fixed wireless.
Sources: Salomon Smith Barney, FCC, Kinetic Strategies, Morgan Stanley Dean Witter, and TeleChoice. *See* Appendix M.

Cable's advantage is that all cable plant is upgradeable; a significant fraction of the existing telephone plant is not. DSL is provided over the existing local telephone network by connecting digital modems over copper loops to the central office, and then ensuring that those loops are free from various electronics (*e.g.*, load coils) that are needed for voice service but that inhibit the provision of data services.[107] DSL service can be provided at high speeds only on loops that are 18,000 feet or shorter,[108] which means that "only about two-thirds of U.S. homes are easily addressable for xDSL."[109] And even with respect to the homes that can be upgraded,

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which finds that, in 2005, 45 percent of high speed subscribers will go with cable and 40 percent will go with DSL.); *TeleChoice Sees Slower But Still Substantial Growth in DSL*, xDSL.com (Aug. 13, 2001), http://www.xdsl.com/content/tcarticles/wp081101.asp.

[105] *See*, *e.g.*, *JP Morgan Cable Industry Report* at 36 ("Assuming that each platform takes 50% share in markets where both services are available, cable enjoys a more than 2:1 advantage in what each platform's "natural" market share would be, holding all other variables – price, performance, bundling benefits – constant.").

[106] *See*, *e.g.*, *Yankee Group Critical Mass Report* at Exh. 4 (cable modem service is expected to be available to 83 percent of households by 2005, while DSL service is expected to be available to 74 percent of households.); *Broadband 2001* at Chart 32 (projecting that about 70 percent of households will have both cable modem and DSL service available by 2005).

[107] There are two main variations of DSL: asymmetric (ADSL), which has a higher downstream than upstream transmission rate; and symmetric (SDSL), which offers an equal downstream and upstream rate. ADSL is the most common form of DSL, and is used most often with residential customers, whereas SDSL is used primarily for business customers. *See Second Advanced Services Report* ¶¶ 36-37.

[108] *See*, *e.g.*, A. Gilroy & L. Kruger, *Broadband Internet Access: Background and Issues*, Congressional Research Service – Policy Papers (May 18, 2001); D. Sweeney, *Ultra Long-Reach DSL : A Whole New Crop of Companies Aims To Boost DSL Performance*, America's Network (Sept. 15, 2001).

[109] *Broadband 2001* at 40.

cable has lower upgrade costs than DSL.[110] This means "that relative to its telco competitors, [cable] has the retail pricing power to under-price competitors while preserving an attractive return."[111]

The two wireless broadband services widely deployed today are broadband provisioned via satellite and terrestrial fixed wireless broadband (MMDS). Broadband satellite services are provided using the same constellation of Direct Broadcast Satellites (DBS) that currently provide video services to more than 17 million subscribers.[112] DBS companies have, in the last year, deployed a two-way high-speed Internet service capable of competing on equal footing with cable modems and digital subscriber lines.[113] The main fixed wireless services provided to residential customers use Multichannel Multipoint Distribution System (MMDS), which uses spectrum in the 2 GHz band.[114] WorldCom and Sprint "own most MMDS spectrum in the United States," and "have commercially deployed MMDS in a handful of markets."[115] WorldCom has recently stepped up efforts to deploy MMDS service, and has begun offering service in four new markets since the beginning of 2002.[116]

Subscribership numbers for broadband satellite remain low: there are an estimated 200,000 subscribers to two-way satellite and fixed wireless broadband services as of year-end 2001.[117] But analysts project that these totals will soon begin to rise rapidly.[118] Whereas

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[110] *See*, *e.g.*, *Broadband 2001* at 69 ("xDSL starts life at a much higher cost point (close to $800) than cable modem (about $470) primarily because cable makes use of shared head-end terminating equipment, whereas DSL requires dedicated line cards for each subscriber.").

[111] *Bear Stearns Byte Fight! Report* at 82.

[112] *See Eighth Video Competition Report*, App. C at Table C-1; SkyReport, *National DTH Counts: November 2000 – November 2001*, http://www.skyreport.com/dth_us.htm.

[113] *Broadband 2001* at 45 (a "true advantage" satellite data services have over wireline alternatives is "instant near-ubiquity").

[114] *See Broadband 2001* at 131.

[115] *Broadband 2001* at 47. In October 2001, Sprint announced the end of customer acquisition for MMDS services, and a freeze on the number of MMDS markets served "until substantial progress is made on second-generation MMDS technology. The current MMDS customer base will be maintained, as will all video services offered through the fixed wireless spectrum." Sprint Press Release, *Sprint to Terminate ION Efforts* (Oct. 17, 2001).

[116] *See* WorldCom Press Release, *WorldCom Launches New High-Speed, Fixed-Wireless Service in Lafayette* (Feb. 21, 2002); WorldCom Press Release, *WorldCom Launches New High-Speed, Fixed-Wireless Service in Pensacola* (Feb. 20, 2002); WorldCom Press Release, *WorldCom Launches New High-Speed, Fixed-Wireless Service in Springfield* (Jan. 9, 2002); WorldCom Press Release, *WorldCom Launches New High-Speed, Fixed-Wireless Service in Hartford* (Jan. 8, 2002).

[117] *See Yankee Group Fiber and Fixed Wireless Report*; *Echostar Hopes New Plan Will Boost Deal's Chances*, Communications Daily at 3 (Feb. 27, 2002).

[118] *See*, *e.g.*, *Yankee Group Consumer Broadband Report* at 4 & Exh. 1 ("[S]atellite broadband will reach 300,000 households in the United States by the end of this year and grow to 4.5 million households by the end of 2005 . . . this will translate into a market share jump from 2.81% at the end of 2001, to 14.48% at the end of 2005."); *Broadband 2001* at Table 9 (estimates show satellite market share expanding from 1 percent in 2000 to 10 percent in 2005); Business Communications Company, Inc. Press Release, *Market for Broadband Internet Access Continue to Soar* (Nov. 1, 2001) ("Two-way satellite broadband Internet access will be the fastest growing single-access technology, with expenditures growing at an AAGR of 36.6% from $ 1.14 billion (or 12.8% of all broadband related expenditures) to $ 5.42 billion, or 20.5% of expenditures.").

wireline services generally get rolled out incrementally, wireless services tend to get "turned on" for an entire geographic area in a single step. Wireless, by its nature, generally provides complete geographic coverage in a region – or, in the case of satellite service – the entire country. That wireless providers currently lag behind wireline providers in serving broadband customers reflects the none-to-all dynamic of wireless roll out, more than anything else.

Several companies also plan to offer residential broadband services using unlicensed spectrum bands, including the 2.45 GHz Industrial-Scientific-Medical (ISM) band and the 5.8 GHz Unlicensed National Information Infrastructure (UNII) band.[119] As noted above, WorldCom has recently accelerated its efforts to deploy MMDS service. Customers within "35 miles of a centrally located transmittal tower" can obtain "high-speed broadband Internet access in as little as five to ten days."[120] The Commission's staff found that the "MDS industry has invested several billion dollars to develop the band for fixed wireless data systems," and that "these systems will provide a significant opportunity for further competition with cable and digital subscriber line (DSL) services."[121]

Competitors are supplying last-mile broadband connections to small business customers, as well as residential customers. Cable operators are beginning to extend their cable networks to provide high-capacity loops to serve small and medium-sized business customers. This push is being driven by the advent of next-generation Voice-over-Internet-protocol technology, which has "solved" "previous difficulties such as [Quality of Service] problems, incompatible and incomplete standards, and lack of equipment."[122] Today, "[b]usiness trials of [Fiber to the Business] are underway . . . with deployment expected this spring."[123] Numerous cable operators already have realized that there are many businesses that lie in close proximity to their networks, and that it makes sense to build out their networks incrementally to serve them.[124]

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[119] *See Broadband 2001* at 49 ("A host of small start-ups are deploying some limited services over unlicensed bands, and some larger providers are running unlicensed spectrum trials."); S. Buckley, *MMDS Hits the Airwaves*, Telecommunications Magazine (Feb. 2001) ("IGI Consulting predicts that by 2005, there will be at least 1000 unlicensed wireless ISPs in operation and 1.3 million subscribers. . . . Unlike licensed MMDS holders that are restricted by the FCC's stringent rules, unlicensed carriers such as Clearwire, Fuzion Wireless and PSInet can set up shop immediately.").

[120] WorldCom Press Release, *WorldCom Launches New High-Speed, Fixed Wireless Internet Service in Springfield* (Jan. 9, 2002).

[121] Carroll McHenry, Chairman and CEO, Nucentrix Broadband Networks, *Third Generation Wireless*, remarks before the Senate Subcommittee on Communications, Committee on Commerce, Science and Transportation, Washington, D.C. (July 31, 2001) (citing FCC "Final Report" at 13). Fixed wireless operators offer consumer broadband services which are priced comparatively to terrestrial broadband services, such as cable modems and DSL. *See*, *e.g.*, E. Tahmincioglu, *For High-Speed Access to the Web, a Dish-to-Dish Route*, N.Y. Times (Oct. 11, 2001) ("The fixed-wireless connection…costs $40 to $60 a month, depending on the provider. Installation and equipment can total around $300 but some companies waive the fees.").

[122] TIA Press Release, *Cable's Fiber to the Business Deployment Spurred by VOIP* (Feb. 14, 2002).

[123] *Id.*

[124] *See*, *e.g.*, G. Lawyer and C. Wolter, *The Cable Giant Stirs*, Sounding Board Magazine (Dec. 1, 2001), http://www.soundingboardmag.com/articles/1c1vox.html (quoting Geoff Tudor, president and CEO, Advent Networks: "Cox realized there were 300,000 small businesses within 50 feet of their coaxial drops, easily reachable. . . That could greatly expand the network's revenue-generation potential."); C. Weinschenk, *Cable Makes Advances Into CLECs'*

Satellite providers have designed service offerings specifically targeted at small business customers. For example, Hughes offers DirecWay service, which is a "business edition Internet access" service that gives "small business[es] access to the same advanced technology that powers global enterprises."[125] The DirecWay service gives business customers the option of much higher throughput and downstream bandwidth than is available with Hughes's basic consumer offering.[126] WorldCom has announced that it would be reselling Hughes's DirecWay Service to small- and medium-sized business customers beginning in January 2002, and rebranding that service with WorldCom's name.[127]

While the provision of broadband services is undeniably competitive today, the most important competitive opportunity over the longer term centers on the chase for far more bandwidth than existing "broadband" networks currently offer. The upgrading of cable, telephone, and wireless networks will not end in the foreseeable future; appetites for bandwidth continue to grow faster than infrastructure can be built. Cable and telephone companies alike will push fiber deeper and deeper into the local exchange, until it finally reaches the home. Wireless providers will multiply and shrink cells, and boost capacities, to keep pace. Much of this new infrastructure will have little relation to the old. ILECs will accordingly enjoy no particular advantages over competing carriers in deploying this new infrastructure.

Wake, Multichannel News at 18 (Dec. 3, 2001) (Charter likewise has, in addition to over 1,300 small and medium-sized business customers, fiber connections to approximately 400 businesses; these 400 businesses serve approximately 4,200 home workers with VPNs); M. Reilly, *New Cable Modem Target: Businesses*, CityBusiness (May 18, 2001) (Michael Fox, vice president and general manager of Time Warner Cable in Minneapolis, said roughly 50,000 businesses were located within range of the company's cable service area, though one-third of the businesses already signed up needed some sort of network buildout. However, "[i]t made a lot of sense to expand into the business sector.").

[125] DirecWay, *For Small Business*, http://www.hns.com/direcway/for_small_business/learn_more/overview.htm.

[126] There are three service plans for business service: Business Basic (500 MB throughput, up to 400 kbps downstream); Business Plus (800 MB throughput, up to 750 kbps downstream); Business Premium (1000 MB throughput, up to 1000 kbps downstream). DirecWay, *Business Edition Internet Access*, http://www.hns.com/direcway/for_small_business/learn_more/business_edition.htm.

[127] WorldCom's service will be available in 600 kbps, 800 kbps, or 1 Mbps download speeds, with 128 kbps upload speeds. WorldCom's service level agreement with Hughes guarantees an upload speed of 128 kbps. J. Wagner, *WorldCom Is Now Truly Long Distance*, ISP News (Nov. 27, 2001), http://www.internetnews.com/isp-news/article/0,,8_929181,00.html.

V. FACILITIES-BASED COMPETITION VERSUS RESALE

The Commission has affirmed that, "in the long term, the most substantial benefits to consumers will be achieved through facilities-based competition."[1] "Facilities-based competition is the ultimate objective" of the Commission's competition policy."[2] At the same time, however, the Commission has attempted to craft its unbundling regulations to promote the "rapid introduction of competition in all markets."[3] The Commission's other stated objective has been to encourage CLECs "to serve the *greatest number of consumers as rapidly as possible*."[4]

Experience since the 1996 Act establishes that facilities-based competition has evolved largely apart from UNE-based forms of competitive entry – and that regulatory policies focused on promoting the indiscriminate use of UNEs advances the short-term appearance of competition over the long-term substance.

The enormous increase in facilities-based competition over the past six years has had very little to do with the availability or use of UNEs. Competitors have instead relied on facilities-based strategies from the outset. They have grown incrementally, establishing a foothold and then expanding core network facilities step by step into new geographic and product markets. Over time, this strategy has delivered robust competition to very significant numbers of both business and mass-market customers.

Overall, however, the current regulatory structure has favored the rapid proliferation of small, under-funded, technically unsophisticated competitors, over the more measured evolution of robust and durable ones. All too often, it has been easier and cheaper for a CLEC to piggy-back on the incumbent's network permanently rather than build out a network of its own. Such CLECs have attempted to enter local markets very rapidly, on a very large scale, by relying predominantly – and all too often exclusively – on UNEs. The Commission expected these competitors to rely on UNEs only until it "was practical and economically feasible to construct their own networks."[5] But many CLECs have adopted business strategies that center on long-term reliance on UNEs, with no expectation at all of ever building facilities to replace them. A significant number rely on ILEC networks from end-to-end, which they do primarily through the

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[1] *Promotion of Competitive Networks in Local Telecommunications Markets*, Notice of Proposed Rulemaking and Notice of Inquiry in WT Docket No. 99-217 and Third Further Notice of Proposed Rulemaking in CC Docket No. 96-98, 14 FCC Rcd 12673, ¶ 4 (1999); *see also UNE Remand Order* ¶ 110 ("the construction of new local exchange networks" benefits consumers, the Commission has explained, because facilities-based carriers "can exercise greater control over their networks, thereby promoting the availability of new products that differentiate their services in terms of price and quality"); Michael K. Powell, Chairman, FCC, *Digital Broadband Migration – Part II* at 4 (Oct. 23, 2001), http://www.fcc.gov/Speeches/Powell/2001/spmkp109.pdf ("Facilities-based competition is the ultimate objective" of the Commission's competition policy.); *id.* (unbundling policy "should provide incentives for competitors to ultimately offer more of their own facilities").

[2] Michael K. Powell, Chairman, FCC, *Digital Broadband Migration – Part II* at 4 (Oct. 23, 2001), http://www.fcc.gov/Speeches/Powell/2001/spmkp109.pdf.

[3] *UNE Remand Order*, 15 FCC Rcd at 3705.

[4] *Id.*

[5] *Id.* ¶ 6.

effective "resale" of ILEC service that is made possible by the unrestricted availability of the UNE Platform.

Many of the CLECs pursuing UNE-centric strategies have failed. Investors have recognized that these CLECs are engaged in highly speculative ventures of regulatory arbitrage, and offer no true value of their own. The UNE-centric CLECs have harmed their facilities-based counterparts, too. Facilities-based CLECs recognize that the unrestricted availability of UNEs priced at a regulator's estimation of long-term incremental cost can ruin a business making steep capital investments at here-and-now, real-world prices. These facilities-based CLECs view the availability of the full UNE Platform as particularly harmful to facilities based competition. *See* Table 1.

Table 1. CLECs Opposing the Availability of UNE Platforms
Allegiance Telecom, Cablevision Lightpath, Cbeyond Communications, Time Warner Telecom, XO: "[T]he evidence submitted in this proceeding since the *UNE Remand Order* was released confirms that competition is thriving in markets where the requirement to provide unbundled switching has been removed."
Allegiance Telecom: Expanding "the availability of the UNE-P" "threatens to harm those CLECs that have built their own facilities and do not need to rely on the UNE-P to serve customers."
UNE-P pricing levels "could well be too low," which "mak[es] it more difficult for efficient, facilities-based [competitive local exchange carriers] to compete."
"[O]nly carriers that make investments in networks and equipment are able to deliver the product, technology and service innovations that provide competitive alternatives to the ILEC."
Choice One: "Choice One's business experience demonstrates that new entrants can provide service to small business customers . . . without the need to rely on unbundled local switching purchased from an incumbent LEC. . . . We are unaware of any reason why another carrier could not replicate it using unbundled loops and self-deployed switches, even in second and third tier urban markets. The Commission's rules governing unbundled local switching should reflect this fundamental fact."
TCG (pre AT&T merger): The FCC should "ensure that wholesale competition does not drive out or diminish the development of strong, facilities-based competition."
Sources: See Appendix M.

Based on the first comprehensive study of its kind, one of the Commission's own economists recently found that "states with lower UNE prices have less facilities-based entry."[6] Other noted economists, scholars, and jurists have reached the same conclusion: unbundling ultimately undermines facilities-based investment.[7] If an incumbent carrier aggressively sold its

[6] James Eisner, FCC, & Dale Lehman, Fort Lewis College, *Regulatory Behavior and Competitive Entry*, for presentation at the 14th Annual Western Conference Center for Research in Regulated Industries, at 2 (June 28, 2001). According to its authors, this study does not necessarily represent the views of the FCC itself.

[7] *AT&T v. Iowa Utils. Bd.*, 525 U.S. 366, 429 (1999) (Breyer, J., concurring in part and dissenting in part) ("Increased sharing by itself does not automatically mean increased competition. It is in the *un*shared, not in the shared, portions of the enterprise that meaningful competition would likely emerge. Rules that force firms to share *every* resource or element of a business would create, not competition, but pervasive regulation, for the regulators, not the marketplace, would set the relevant terms."); M. Stanton Evans, *Last Mile Is the Hardest*, Consumers' Research Magazine (Aug. 1, 2001) (quoting economist Tom Hazlett: "Neither local phone nor cable companies will make the enormous capital investment necessary to expand broadband, he argues, if 'open access' rules require them to share the resulting infrastructure with their competitors at below-market rates."); *MCI Restarts Marketing Local Residential Service in N.Y.*, Comm. Daily (Feb. 4, 1999) (quoting James Cicconi, executive vice president and general counsel,

own services *below cost* on its own initiative, or even just pared prices down to zero-margin "imaginary network" levels, it would be accused of "predatory pricing" – of attempting to discourage or ruin real competitors that were building competing networks alongside.

The unrestricted availability of UNEs discourages new ILEC investment, too. There is no incentive to invest in risky new infrastructure when the threat of future unbundling mandates directed at those facilities eviscerates the business case for deploying them. As AT&T's chairman has put it, "[n]o company will invest billions of dollars to become a facilities-based broadband services provider if competitors who have not invested a penny of capital nor taken an ounce of risk can come along and get a free ride on the investments and risks of others."[8]

But facilities-based investment is precisely what is needed. As the Commission has recognized, "the widespread deployment of broadband infrastructure has become the central communications policy of the day."[9] This will require "the complete or near-complete replacement of copper lines with end-to-end fiber optic transmission facilities."[10] The existing UNE regime significantly discourages investment in this new infrastructure, by both the facilities-based CLECs, and by the ILECs themselves.

A. Efficient Facilities-Based Entry.

The robust levels of competition now offered by numerous CLECs establish that facilities-based competition is possible. The business strategy that works is to enter by way of high-margin markets and value-added markets: the urban carrier and business markets first targeted by local fiber companies, and the wireless and broadband markets targeted by wireless, cable, and other facilities-based providers of switches and alternative forms of transport. These have been the successful entry points; facilities-based competition for the rest of the market has spread out rapidly from there.

AT&T: "[T]he last thing that government should do is create uncertainty that would have a chilling effect on, and perhaps even retard, these investments."); A. Wilson, *Harmonizing Regulation by Promoting Facilities-Based Competition*, 8 Geo. Mason L. Rev. 729 (Summer 2000) ("Regulatory uncertainty casts a pall over capital markets and dries up critical financial support. Communications policymakers must therefore create and sustain a stable regulatory environment if they want to nurture the development of facilities-based competition."); T. Jorden, J.G. Sidak, and D. Teece, *Innovation, Investment, and Unbundling*, 17 Yale J. on Reg. 8 (2000) ("It makes no economic sense for the ILEC to invest in technologies that lower its own marginal costs, so long as competitors can achieve the identical cost savings by regulatory fiat."); 3A Phillip Areeda & Herbert Hovenkamp, *Antitrust Law* ¶ 771(b), at 175 (1996) (When a company is to "provide [a] facility and regulat[es] the price to competitive levels, then the [prospective entrant's] incentive to build an alternative facility is destroyed altogether."); R. Cowles, *et al.*, Gartner Dataquest, *UNEs: Stifling U.S. Broadband Growth and Ineffective in Promoting Local Competition* at 5 (2002) (UNE policy has resulted in a "near-complete halt to advanced infrastructure investment from the incumbents and newcomers.").

[8] C. Michael Armstrong, Chairman and CEO, AT&T, *Telecom and Cable TV: Shared Prospects for the Communications Future*, remarks before the Washington Metropolitan Cable Club, Washington, D.C. (Nov. 2, 1998).

[9] *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, Notice of Proposed Rulemaking, 17 FCC Rcd 3019, ¶ 1 (2002).

[10] *Id.*; *see also* R. Cowles, *et al*., Gartner Dataquest, *UNEs: Stifling U.S. Broadband Growth and Ineffective in Promoting Local Competition* at 8 (2002) ("There is general recognition within the communications and information industry that fiber will ultimately be the most efficient and flexible end-to-end infrastructure").

1. Incremental Development of Facilities-Based Competition.

As demonstrated in Section I, the CLEC industry as a whole remains healthy. The most successful individual CLECs are those that have pursued a strategy of facilities-based entry. Their common business strategy has been to deploy facilities to serve high-margin markets first, then build out from there, to extend their competitive reach incrementally, into new service sectors and new geographic markets.

None of the successful competitors has emphasized factors that the Commission has at times deemed important – factors such as "ubiquity," or "rapid[]" entry to serve "the greatest number of customers."[11] None of the successful competitors has viewed ubiquitous service or instant roll-out as competitively necessary. None has proceeded on the assumption that the evolution of its business required the very rapid development of a very large footprint. To the contrary, they have prospered by emphasizing just the opposite, at the outset: smaller operations, carefully targeted at the most profitable geographic and service sectors.[12] Much broader competition has then evolved relentlessly from these facilities-based beachheads. And it has now reached the point where it is developing very rapidly indeed.

Switching. As discussed in Section II, competitive switches were first deployed by large business customers and then by competitive-access providers. This base of competitive switching capacity has since evolved, market by market, to serve smaller business customers and, most recently, residential subscribers. Adding customers and traffic at the margin has grown progressively cheaper. A switch deployed initially to serve the single large customer at a single point then serves a number of smaller customers, and then becomes part of larger network, serving additional, smaller, more widely dispersed sources of traffic.

Packet switching services have evolved in similar fashion. High-speed ATM and frame relay switches are deployed first to provide high-margin broadband data services. E-mail and messaging then begin to substitute, at the margin, for voice calls. Then two-way voice traffic migrates on to these packet switches.

As discussed in Section II, this evolutionary process is now robustly established, and the business model is well understood and mature. There are large numbers of competitive circuit switches in actual service. They can and do serve both large business and mass-market customers. Their geographic reach can be extended with trunks to remotes, and frequently is. Packet switches are multiplying even faster, and packet-switched traffic is now making very substantial in-roads into service areas traditionally served by circuit switches.

Fiber, Transport, and High-Capacity Loops. Competition has evolved in a similar fashion in the markets for transport and high-capacity loops. The interoffice transport and local

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[11] *UNE Remand Order* ¶ 107.

[12] *See*, *e.g.*, Time Warner Telecom, *Company Growth*, http://www.twtelecom.com/cgrowth.html ("growth plans focus on geographic expansion, extension into new market segments and development of new data and Internet-based products and services."); V. Bajaj, *Allegiance Will Borrow $ 350 Million to Invest*, Dallas Morning News (Sept. 19, 2001) (Allegiance has "pursued a more deliberate and slower national expansion than most of its competitors."); *Royce Holland, The Top Enterpreneurs*, Bus. Week (Jan. 14, 2002) (While its "rivals took on mountains of debt, the chief executive of Allegiance Telecom played it safe, borrowing little and expanding slowly.").

loop UNEs are both wireline facilities that transmit information between two fixed points. Here again, the early competitors first targeted a small number of high-margin opportunities, then built out from there. In the mid-1980s, "competitive access providers" ran their networks to the very largest customers in the largest geographic markets – long-distance carriers in the densest urban areas. Then, year by year, the CAPs extended both their networks and their businesses, to serve business customers, and less densely populated areas. Again, this process has matured; there are now extensive networks in place in all major urban markets.

Once a fiber network is deployed and the investment sunk, the facilities can be used to serve other on-net customers, including many whose traffic volumes would never have justified the original deployment of the network. Similarly, networks can be economically extended block by block, to points that would never have been economical to reach mile by mile. When they deploy fiber, carriers invariably deploy far more capacity than they can use immediately, to facilitate precisely this process of incremental future development.

This process of competitive evolution is now accelerating rapidly, for two reasons. Extensive competitive networks are already in place; the marginal cost of extending them to pick up new customers is far lower, now, than it was at the outset. And surging volumes of data traffic make the deployment of competitive fiber increasingly economical, for an ever-expanding base of potential customers. CLECs now routinely offer service to many business customers that are not already served by their fiber networks; the CLEC will extend its network one spur or branch at a time, to pick up the new traffic.

Narrowband Loops. Wireless has emerged as a serious competitor to the narrowband ILEC loop through a similar, at-the-margin process of upgrading the network and capturing economies of scope and scale. Wireless began as a high-priced service for the handful of high-end customers willing to pay a high premium for a mobile loop. Over time, wireless operators were able to begin competing for a greater segment of customers willing to pay for mobility. As they have built out their networks, wireless carriers have begun to compete directly for virtually all second-line loops, and for an increasing share of primary-line loops as well.

Cable, which offers not one but two important alternatives to the ILEC loop, has evolved as competitive alternative in a similar way. Coaxial cable networks were originally deployed to offer video. With these networks in place, a number of cable operators found it economical to add circuit-switched voice telephony and high-speed data capabilities. Cable now competes directly against ILEC loop for the last-mile transport of packet-switched data traffic, which now accounts for substantially more than half of all telecom traffic. And in many areas, cable competes directly with ILECs for primary line voice service as well.

Broadband. A broadband link to the packet-switched network provides a connection to all other Internet users, whether linked through telephone lines, cable modems, land-based wireless connections, or satellite connections. In the past three years, cable operators have completed outfitting the vast majority of their networks with two-way capabilities. Almost all cable operators are now rapidly deploying high-speed data capabilities. The costs of upgrading cable plant have been falling steadily, and cable operators have captured very significant economies of scope in deploying digital platforms that can be used for digital television and high-speed data, as well as packet-switched voice.

Much of the new broadband infrastructure has had little relation to the old. Fiber has replaced copper in the loop; packet switches have replaced circuit switches in the central office; and the transport between these packet switches has used very different routes than the rigid point-to-point connections between central offices. In deploying this new infrastructure, ILECs have thus enjoyed no particular advantages over competing carriers.

2. Economies of Scope and Scale.

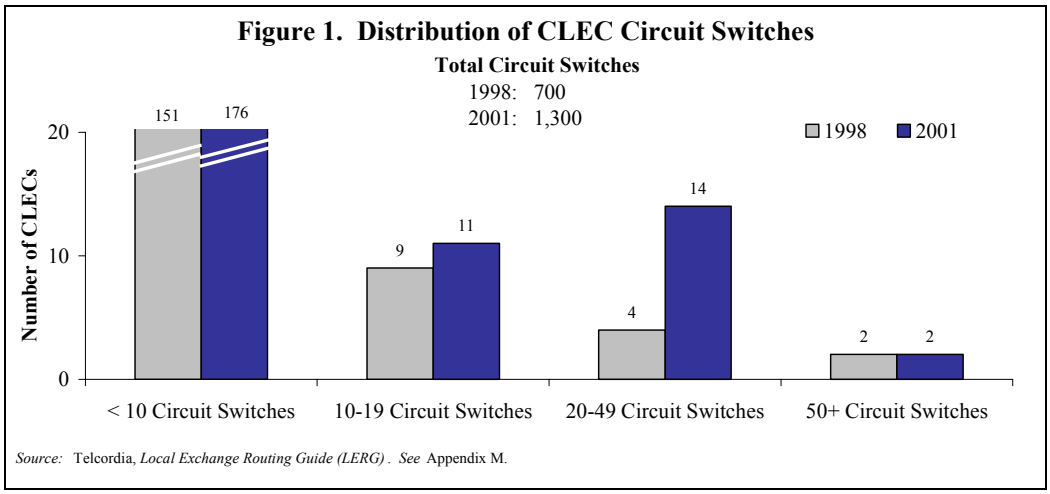
In the *UNE Remand Order*, the Commission found that, "[b]ecause competitors do not yet enjoy the same economies of scale, scope and ubiquity as the incumbent, they may be impaired if they do not have access, at least initially, to certain network elements supplied by the incumbent LEC."[13] As discussed above, however, the assumption that immediate scale and scope economies are essential to competitive success is not borne out by actual experience in the marketplace. The successful competitors have started out with high-*margin* business strategies, not high-*volume* strategies, and expanded incrementally from there. The economies of scope and scale have followed, not led, the competitive process.

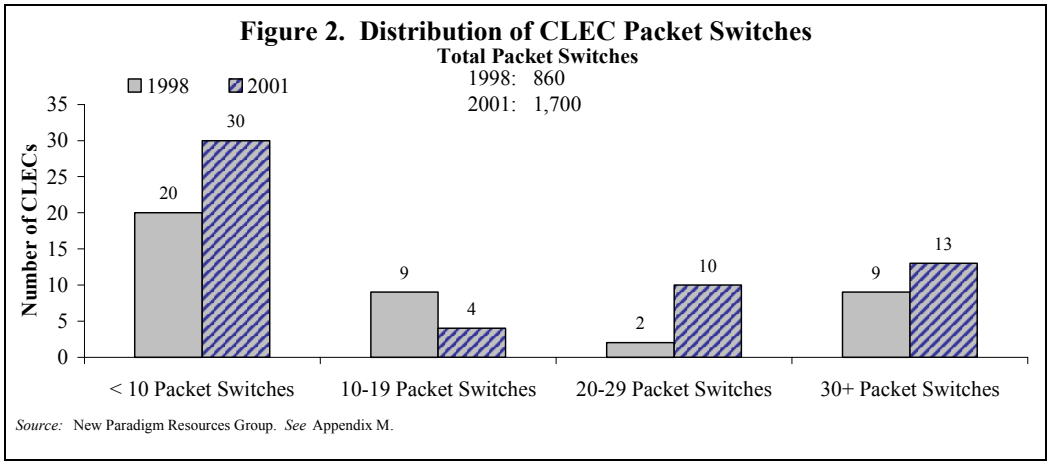
With that said, incremental growth has now culminated in a significant number of CLECs that enjoy very significant economies of scale. As Table 2 indicates, the twenty largest CLECs today have 100 percent more switches, 190 percent more fiber-route miles, and earn 150 percent more in total revenues than the twenty largest CLECs at the time of the *UNE Remand Order*. *See* Table 2.

[13] *UNE Remand Order* ¶ 14.

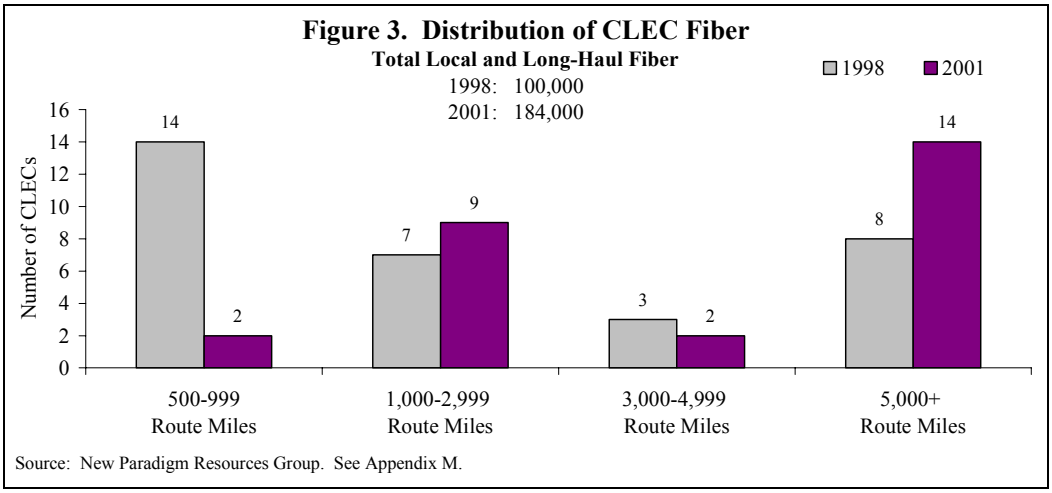
Table 2. Twenty Largest CLECs (by Revenues): 1998 vs. 2001							
1998				2001			
CLEC	**Revenues ($millions)**	**Circuit Switches**	**Fiber Route Miles**	**CLEC**	**Revenues ($millions)**	**Circuit Switches**	**Fiber Route Miles**
AT&T	$7,451	88	11,400	WorldCom	$16,716	120	n/a
WorldCom	$4,894	104	8,811	AT&T	$16,000	246	16,000
Intermedia	$713	31	839	McLeodUSA	$1,800	34	31,000
McLeodUSA	$604	4	7,120	XO	$1,180	39	20,661
ICG	$398	9	4,242	Time Warner Telecom	$775	38	15,249
General Comm.	$247	3	200	Allegiance	$545	26	5,000
RCN	$245	2	1,400	RCN	$520	10	9,030
BTI Telecom	$213	n/a	110	ICG	$480	35	5,500
ITC^DeltaCom	$172	n/a	7,800	Adelphia	$475	28	19,186
ALLTEL	$167	5	0	KMC Telecom	$450	33	2,336
GST Telecom	$163	20	6,632	Network Plus	$410	3	n/a
e.spire	$157	18	1,742	ITC^DeltaCom	$400	42	9,980
Global Crossing	$153	16	0	e.spire	$375	25	3,834
WinStar	$141	27	0	Cox	$350	13	9,000
NEXTLINK	$140	18	2,477	Focal Comm.	$345	19	n/a
Time Warner Telecom	$122	18	6,968	CTC Comm.	$336	2	8,300
CapRock Comm.	$122	n/a	800	General Comm.	$330	3	200
Ionex	$114	n/a	1,400	BTI Telecom	$320	14	4,400
Network Plus	$106	2	0	CoreComm	$300	7	n/a
Electric Lightwave	$101	7	3,091	Global Crossing	$260	24	400
Sources: Telcordia, *Local Exchange Routing Guide (LERG)*; New Paradigm Resources Group. *See* Appendix M.							

Switches. At the time of the *UNE Remand Order*, only 15 CLECs had deployed 10 or more circuit switches, and only 6 had deployed 20 or more. *See* Figure 1. Today, at least 27 CLECs have deployed 10 or more circuit switches, and at least 16 have deployed 20 or more. *See id*. The increase in the size of CLEC data networks has been equally dramatic. At the time of the *UNE Remand Order*, only 20 CLECs had deployed 10 or more packet switches, and only 11 CLECs had deployed 20 or more. Today, at least 27 CLECs have deployed 10 or more packet switches, and at least 23 CLECs have deployed 20 or more. *See* Figure 2.





Fiber, Transport, and High-Capacity Loops. At the time of the *UNE Remand Order*, only 18 CLECs had deployed 1,000 or more route miles of local and long-haul fiber, only 11 had deployed 3,000 or more, and only 8 had deployed 5,000 or more. Today, at least 25 CLECs have deployed 1,000 or more route miles, 16 have deployed 3,000 or more, and 14 have deployed 5,000 or more. *See* Figure 3.



Wireless Alternatives to the Narrowband Loop. At the time of the last UNE review, there were only three "nationwide" mobile telephony operators, as the FCC defines that term.[14] Today, there are six nationwide operators.[15] At the time of the last UNE review, the ten largest mobile wireless operators had an average of 5.1 million subscribers each. Today, the ten largest mobile operators have an average of 9.4 million subscribers each.[16]

Broadband Alternatives to the High-Frequency Loop. At the time of the last UNE review, deployment of broadband was still "in the early stages of development."[17] At that time, cable operators had only about 300,000 broadband customers.[18] Today, by contrast, cable operators have approximately 7.5 million broadband customers.[19]

3. Emergence of Competitive Resale Markets.

Across the board, competition has now advanced to the point that competitive wholesale markets are now emerging. The players in these markets are the markets' own answer to the Commission's UNE regime – they offer reasonably close analogies to unbundled network elements, at wholesale prices.

As discussed in Section III.C, there has been a dramatic increase in fiber supplied by alternative wholesale suppliers. These players typically sell or lease dark fiber to other carriers, but do not themselves engage in the provision of telecommunications services. They have raised about $2 billion in capital since the third quarter of 2000,[20] and analysts expect this market sector to grow rapidly.[21] A Web-based trading pit for the urban fiber that they provide now includes over 35 fiber wholesalers listing "over 10,000 *local* route miles" of fiber[22] in more than 60 cities.[23] For a growing number of CLECs, the fiber provided by these wholesale suppliers satisfies a large part of their demand for last-mile local connectivity and interoffice transport.

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[14] *See Fourth CMRS Report* at 9.

[15] *See Sixth CMRS Report* at 13.

[16] *Compare Fourth CMRS Report*, App. B at Table 4 *with Sixth CMRS Report*, App. C at Table 3.

[17] *First Advanced Service Report* ¶ 16.

[18] *See* Cable Datacom News, *December 1998 Highlights*, http://cabledatacomnews.com/dec98/dec98-1.html.

[19] *See Morgan Stanley Cable Modem/xDSL Report* at Exh. 3 (cable modem subscribers as of 4Q 2001).

[20] P. Brown, *Despite Tighter Purse Strings, Cash Is Still Streaming to Metro Providers*, Tele.com (Aug. 13, 2001) (citing Yankee Group and quoting Blake Bath, telecom analyst at Lehman Brothers Equity Research).

[21] According to consulting firms Cambridge Strategic Management Partners and McKinsey & Co, "[t]he market for reselling . . . dark fiber to ISPs and telecom carriers is projected to grow from about $2 billion today to about $10 billion by 2006." *See* N. Orman, *Networking Startups Battle For Cities*, Silicon Valley/San Jose Bus. J. (Oct. 26, 2001).

[22] D. Mohney, *Fiberloops.com – One-stop Shopping*, ispworld.com (Aug. 22, 2000).

[23] Fiberloops.com, *Find Fiber and Facilities Fast*, http://www.fiberloops.com/Fiberloops/home.html.

Resale markets have likewise developed for the provision of wireless services.[24] As the Commission has noted, wireless resellers "offer service to consumers by purchasing airtime at wholesale rates from facilities-based providers and reselling it at retail prices."[25] According to the Commission's *Sixth CMRS Report*, the top 20 resale providers had just over 3 million subscribers as of year-end 2000, twice as many as they did in 1999.[26] Wireless carriers hammered out wholesale contracts among themselves years ago, to cover "roaming"; intercarrier roaming rates have been rapidly declining.[27] And wireless carriers enter into wholesale deals with large corporate customers, too.[28] At least 20 percent of businesses provide wireless services to their employees through deals they have negotiated with carriers to provide discounted rates for preset call volumes.[29]

A wholesale/resale market for broadband links is now beginning to emerge as well. GTE and AOL began open access trials in 1999, proving that "[c]able providers can easily and affordably open up their networks for high-speed Internet competition."[30] Many cable companies assert that open access will occur naturally, and that it is in both their best interest and that of consumers.[31] And many have already entered into agreements to allow unaffiliated ISPs access to their networks.[32]

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[24] Early on, the Commission granted cellular A-side carriers certain rights to resell the B-side (*i.e.*, typically incumbent wireline) carriers' services, to maintain early competitive parity notwithstanding the head-start that the B-side carriers got in building out their networks. *See* 47 C.F.R. § 20.12 (b)(3). Those resale rights will expire in November 2002, however.

[25] *Sixth CMRS Report* at 34.

[26] *Id.* at 34-35.

[27] *See*, *e.g.*, *Yankee Group State of the Wireless Union Report* at 6; M. Berghausen, Morgan Stanley Dean Witter, Investext Rpt No. 8313844, AllTel Corp.: Initiating Coverage – Company Report at *3 (Dec. 21, 2001).

[28] *See*, *e.g.*, H. Smith, *Verizon Adds to Telematics Stable with Wingcast Partnership*, RCR Wireless News at 2 (Dec. 17, 2001) (The one million-plus users of General Motors' OnStar service in luxury cars, for example, are in fact served via Verizon Wireless's network. Verizon Wireless has entered into a similar agreement with Wingcast, a joint venture between Ford Motor Co. and Qualcomm.).

[29] *See*, *e.g.*, M. Hamblen, *Wireless Merger a Boon for National Coverage*, Computerworld (Sept. 27, 1999).

[30] *GTE Demonstrates Ease of Cable Open Access to Multiple ISPs; Clearwater Trial Shows One-Time Investment of Less Than $1 Per Home Would Provide Consumer Choice*, Bus. Wire (Jan. 14, 1999) (quoting AOL senior vice president George Vradenburg).

[31] *See*, *e.g.*, A. Siedsma, *Gov Watch a Question of Access*, T Sector (Feb. 1, 2001), http://www.thetsector.com/showStory.cfm?ts_story_id=838 (Bill Geppert, VP and GM of Cox in San Diego, emphasized the "strong willingness on the part of broadband providers to offer multiple ISPs as part of their platform," with Cox and other companies "moving in that direction."); M. Martin, *Cable's Connections*, Wash. Bus. J. (Jan. 28, 2000), http://washington.bcentral.com/washington/stories/2000/01/31/focus1.html (George Vradenburg, AOL: "open access promotes consumer choice in high-speed Internet service and will encourage innovation in new Internet applications."); Statements by C. Michael Armstrong, Chairman and Chief Executive Officer, AT&T Corp., in *Telecom Mergers: En Banc Hearing on Telecom Mergers To Discuss Recent Consolidation Activities in the Telecommunications Industry, Focusing on Three of the Proposed Mergers Before the Federal Communications Commission* (Oct. 22, 1998) (open access is "[f]irst . . . the right thing to do. Second, it's in our self-interest. . . . Content is essential to make money in networks. The only way to make money in networks is to have the highest degree of utilization.").

[32] *See, e.g.*, *AT&T Broadband Opens to Other ISPs*, Associated Press (Mar. 13, 2002); M. Mosquera, *Time Warner to Open Cable Network to Earthlink*, Internet Week (Nov. 20, 2000), http://www.internetweek.com/story/

4. Geographic Expansion

The Commission stated in the *UNE Remand Order* that "markets outside of major metropolitan areas . . . have seen minimal competition."[33] That is no longer the case today. CLECs are now using their facilities to serve markets of all sizes, throughout the country. For example, CLECs have obtained collocation arrangements to serve wire centers that contain more than 80 percent of the access lines in the Bell companies' regions.[34] And CLECs are using their own switches to serve customers in wire centers that contain approximately 86 percent of all lines in the Bell companies' regions.[35]

Many CLECs have specifically targeted smaller markets, often precisely because the larger markets have already become saturated with facilities-based competition. Analysts have noted that "[i]n tier 2/3 markets, fundamentals are more favorable primarily due to less available capacity."[36] More than a dozen CLECs have adopted a strategy of specifically serving smaller markets (*e.g.*, Tier II, Tier III, or Tier IV markets). *See* Table 3. In addition, many CLECs that serve larger markets, have expanded into smaller markets as well.[37]

INW20001120S0002; R. Mark, *Cox Begins Its First Open Access Broadband Trials*, Internetnews.com (Nov. 6, 2001), http://www.internetnews.com/isp-news/article/0,,8_917471,00.html.

[33] *UNE Remand Order* ¶ 11.

[34] *See* Section II.A.2, Table 10.

[35] *See* Section II.A.1, Table 5.

[36] J.M Ackor, RBC Capital Markets, Investext Rpt No. 8239217, Broadband Services – Bandwidth Pricing Update – Industry Report at *1 (Oct. 29, 2001).

[37] *See*, *e.g.*, S. Weinburg, C. Shobrook, G. Mycio and L. Singleton, *Appraising the CLEC Landscape*, Xchange Magazine (June 2000), http://www.xchangemag.com/articles/061feat1.html ("The current trend, however, shows that while CLECs are developing a foundation among first-mover small and medium-sized businesses in large markets, there is a trickling downward of services into Tier 2 and 3 markets.").

Table 3. Examples of CLECs That Have Specifically Targeted Smaller Markets	
Advanced TelCom Group	Offers "bundled Internet, broadband data, and voice services to small and medium-sized businesses in third and fourth tier markets throughout the U.S."; targets third and fourth tier cities with populations between 100,000 and 750,000 people and between 50,000 and 200,000 business access lines."
AFN Communications	"AFN is targeting underserved markets . . . 'We think this will clearly give them an opportunity to establish a beachhead. They are targeting a market opportunity that has gone untapped by the current crop of service providers.'"
BayRing Communications	"BayRing is a regional CLEC offering local, long distance, high-speed Internet service, and dedicated access to businesses in Tier 3 markets in New Hampshire and Maine."
Choice One Communications	"Our company currently provides service to clients in 30 second and third-tier markets in eleven states where there are fewer competitors than in larger metropolitan areas."
Cinergy Communications	"The focus for Cinergy Communications is toward small businesses in the region of Southern Indiana and Western Kentucky. Cinergy believes it can offer telecom services to areas that otherwise do not have many choices."
Volaris Online (formerly DUROCOM)	"DUROCOM is a full service, facilities-based provider of Internet data and broadband communications solutions to consumers and small to medium-sized businesses in tier II and tier III markets in the southeastern United States."
e.spire Communications	"e.spire's establishment of footholds in 'uncrowded' Tier 2 and Tier 3 markets represented arguably the company's most significant competitive advantage," says Lizet Tirres, research analyst, Stratecast Partners.
Crescent Telephone	"'Our proven track record in serving rural and suburban customers ideally positions Crescent Telephone to offer complete telecommunications solutions to markets historically underserved by traditional carriers,' said Jacob Roquet, GIEX president and CEO, and founder of CoastalNet and Crescent."
KMC Telecom	"KMC's business has two distinct components: serving communications-intensive customers in markets with populations between 100,000 and 750,000, referred to as Tier III markets, which larger carriers have typically overlooked; and providing data services on a nationwide basis."
Knology	Although CEO Rodger Johnson "admits his markets aren't crowded with competitors, he says the idea that second and third tier markets are less competitive is a myth. 'When you get down to markets with 100,000 [homes], you can't divide that pie up more than about three ways and make it economically viable,' he says."
LecStar Communications	"LecStar focuses on underserved markets in the south… LecStar believes these secondary cities are relatively underserved."
Lightship Telecom	"Lightship Telecom is targeting small to medium-sized businesses in Tier Two and Three markets."
NECLEC	"NECLEC offers voice and data services primarily in Tier Two, Three, and Four cities in the Northeast/Mid-Atlantic region."
Sources: See Appendix M.	

To be sure, facilities-based competition has inevitably emerged earlier in some markets, and later in others. States with larger concentrations of business customers[38] are more attractive

[38] The percentage of switched business lines as a percentage of total switched lines in the state varies from as low as 25 percent (in Tennessee) to as high as 69 percent (in Washington, D.C.). *See FCC Statistics of Common*

to competitors.[39] More rural states are more costly to serve.[40] Regulatory differences have played a major role too. As noted earlier, some states have imposed wholesale rates on ILECs that artificially suppress the emergence of facilities-based competition.[41] Some states opened their local markets to competition before the passage of the 1996 Act, and much earlier than some other states.[42] Some states have set retail rates – particularly for residential customers – very low, which also discourages entry.[43]

B. The Failure of Non Facilities-Based Competition.

Since the last UNE review, many CLECs have attempted to enter local markets very rapidly, on a very large scale, by relying exclusively, or almost so, on UNEs obtained from ILECs. The Commission at one time suggested that these competitors would rely on UNEs only until such time as it "was practical and economically feasible to construct their own networks."[44] Many of these ostensible competitors, however, have adopted business strategies that do not involve deployment of their own facilities at any time in the foreseeable future. Investors have grasped that these business models offer little if any true value to customers. Many of the CLECs pursuing UNE-centric strategies have failed.

Carriers, 2000/2001 ed. at Table 2.4. New York, California, Texas, Illinois, and Ohio are home to the greatest number of Fortune 500 company headquarters – more than 200 companies, collectively. No Fortune 500 company has established its headquarters in 10 states (Alaska, Hawaii, Maine, Montana, New Hampshire, New Mexico, North Dakota, Vermont, West Virginia, and Wyoming). *See Fortune 500 List*, Cincinnati Enquirer (Apr. 2, 2001), http://enquirer.com/editions/2001/04/02/fin_fortune_500_list.html.

[39] *See*, *e.g.*, FCC, *Biennial Regulatory Review 2000 – Staff Report*, App. IV, Pt. 54, 15 FCC Rcd 21089, 21266 (2000) ("Competition for business customers in metropolitan areas has, in general, developed more rapidly than competition for residential customers or customers in rural areas."); *FCC Local Competition Report, Dec. 1998 ed.* at 2 ("Facilities-based CLECs appear to have concentrated in more urbanized areas.").

[40] Rural populations vary widely between states, from a low of 10.6 percent in New Jersey in 1990, to a high of 67.8 percent in Vermont in 1990. *See* U.S. Census Bureau, *Urban and Rural Population: 1900 to 1990* (Oct. 1995) http://www.census.gov/population/censusdata/urpop0090.txt. Under the FCC's USF cost model, costs of providing service vary significantly (by as much as 50 percent of more) between highly rural and highly urban states.

[41] *See*, *e.g.,* James Eisner, FCC, & Dale Lehman, Fort Lewis College, *Regulatory Behavior and Competitive Entry*, for presentation at the 14th Annual Western Conference Center for Research in Regulated Industries, at 2 (June 28, 2001).

[42] *See*, *e.g.*, *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, Notice of Proposed Rulemaking, 11 FCC Rcd 14171, ¶ 5 (1996) ("At the time the 1996 Act was signed, 19 states had in place some rules opening local exchange markets to competition, including seven states in which competing firms had already begun to offer switched local service.").

[43] *See Sprint v. FCC*, 274 F.3d 549 (D.C. Cir. 2001) (noting that one of the reasons put forward by the FCC's counsel for low rates of competition in the residential market is that "state commissions have historically set relatively low residential rates . . . allowing the incumbent monopoly to make it up in other aspects of their business."); R. Cowles, *et al*., Gartner Dataquest, *UNEs: Stifling U.S. Broadband Growth and Ineffective in Promoting Local Competition* at 7 (2002) ("Most states have frozen residential basic exchange rates at levels at or below cost. . . . it is the regulators themselves (state regulators and the FCC) that have created this regulatory barrier to competitive entry through a pricing policy that includes subsidy.").

[44] *UNE Remand Order* ¶ 6.

1. The Failure of UNE-Platform Competition.

The UNE Platform is "physically similar to resale. In each case, the CLEC uses the ILEC network to provide service to the end-user and essentially limits its own functions to marketing, inputting the order into the ILEC's systems, and billing."[45] UNE-P requires no incremental investment by a CLEC, but – because of regulatory factors alone – it is generally cheaper than deploying facilities. With the exception of certain vertical features that no more than a few Platform-based CLECs actually provide, end-user customers do not receive any services on any facilities from a UNE-Platform provider that they would not also receive in the simple resale of the ILEC's own service. UNE-P "competition" thus creates little if any opportunity for service differentiation. This competition is not value-added competition at all; it is defined not by expanding output, consumer choice, product quality, or market price, but by federal and state regulators and the TELRIC pricing regime.

As discussed in Section II.A.2, CLECs that rely on the UNE Platform argue that it provides a mechanism for CLECs to build up a customer base before they invest in facilities. But market experience since the time of the *UNE Remand Order* demonstrates that CLECs are not migrating UNE Platform customers to their own facilities to any significant degree (if at all). Many CLECs instead treat UNE-Platform competition as an end in itself, rather than as a stepping stone to facilities-based competition. These CLECs have obtained UNE Platforms to serve mass-market customers but have no plans to convert these customers to their own switches.[46] Conversely, most of the CLECs that serve mass-market customers and that *have* deployed one or more switches of their own make little or no use of unbundled switching from the BOCs.[47]

The UNE-centric CLECs are not only failing to create any facilities-based competition of their own, they have harmed their facilities-based counterparts, too. Facilities-based CLECs recognize that the unrestricted availability of UNEs priced at a regulator's estimation of long-term incremental cost can ruin a business making steep capital investments at here-and-now, real-world prices. As described above, these facilities-based CLECs view the availability of the full UNE Platform as particularly harmful to facilities based competition. *See* Table 1, *supra*.

2. The Failure of the DLEC Model.

"Data CLECs" or DLECs made a similar attempt to jumpstart ubiquitous competition, and were equally unsuccessful. Their business model centered exclusively on providing DSL services. Unlike the UNE-P competitors, the DLECs did typically deploy their own packet switches. But in the broadband market, most of the new value is in getting the broadband loop

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[45] Commerce Capital Markets, *Status and Implications of UNE-Platform in Regional Bell Markets* (Nov. 12, 2001).

[46] *See* Section II.A.2.

[47] *See* Section II.A.2, Figure 4.

itself up and running. That's a difficult challenge on any medium, but an especially difficult one on copper, which wasn't designed for broadband in the first place.[48]

The ILECs themselves have certainly found the deployment of DSL service to be a difficult and costly process[49] – with all the resources at their command, it has taken ILECS more than three years to make the service available to just over 40 percent of the homes they serve.[50] Once the infrastructure is ready for broadband service, it then takes between two and three years to break even on a new DSL customer.[51] The DLECs simply ignored these engineering and economic realities. They cultivated the belief that DSL was easy and inexpensive to deploy.[52] They promised to deploy broadband services faster and more efficiently than incumbent local telephone companies or cable operators.[53]

To grow quickly, the DLECs relied on a business model that centered around resale of the ILECs' loops, with relatively little of the CLECs' own facilities-based investment. In most of the central offices that they intended to serve, the DLECs planned to deploy only a single

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[48] *See*, *e.g.*, L. Gerhardy, *et al.*, Morgan Stanley, Dean Witter, Investext Rpt No. 2262978, Globespan: Initiating Coverage – Company Report at *12 (Aug. 17, 2000) ("While simple in theory, the deployment of high bandwidth services over infrastructures originally designed for simpler purposes has created significant challenges . . . . Most of the Tel-co's wiring infrastructure is decades old, and only a small portion of the frequency spectrum available on the wire was used. However, new digital technologies that exploit the unutilized Telco bandwidth encounter problems from the legacy analog environment for which the infrastructure was designed.").

[49] *See*, *e.g.*, P. Harvey, *The Last Mile is a Rocky Road*, Red Herring (Aug. 1, 2000) ("For DSL providers, one of the biggest hurdles has been the time and expense required to send a truck and technicians to each home that requests service."); Infinilink Corp. White Paper, *Confronting the DSL Bottleneck, or "Why Does It Take So Long to Install DSL?"* (Dec. 2000) (Truck rolls cost on average $300 each, and it takes an industry average of 2.7 truck rolls per DSL line deployed.)

[50] *See JP Morgan Cable Industry Report* at Figures 12 & 36 (estimating that DSL is available to approximately 43 percent of households as of 1Q 2001).

[51] *See*, *e.g.*, G. Miller, *et al.*, ABN AMRO, Investext Rpt No. 8150475, Sprint Corp. – Company Report at *8 (Aug. 9, 2001) ("We point out that DSL today is not profitable for a single carrier out there, including SBC, Verizon, and BellSouth. With a payback period of 18 to 24 months, we do not believe any of these carriers will turn a profit until next year, at the earliest."); *Broadband 2001* at 76 (incremental DSL customers break even on a net present value basis after 3.4 years); J. Bellace and S. Bhasin, Jefferies and Co., DSL Update: U.S. Broadband Penetration Forecasted to Increase from 11% at Year-End 2001 to 17% by Year-End 2002 at 4 (Feb. 4, 2002) ("the number of months it takes to breakeven on a DSL subscriber will decline from 24 months in 2001 to 10 months in 2005.").

[52] *See*, *e.g.*, K. Fong, *et al.*, Hambrecht & Quist Inc., Investext Rpt No. 2658327, Communications Symposium/Data Processing/Telecom – Industry Report at *39 (Apr. 16, 1998) (In early 1998, Covad's chairman proclaimed that "DSL technology is unique in that it has an almost zero cost-per-home pass, an almost zero up-front, fixed-investment cost. . . it can be deployed rapidly because no one has to dig up the streets, no one has to pay franchise fees, and no one has to get city permits to allow this technology to happen."); S. Schmelling, *DCLECs Declassified: The Big Three of Data Are So Much Cooler Than Their Name*, Upstart (Oct. 4, 1999) (Rhythms's CEO likewise noted that "on a level of difficulty, [DSL is a] two on a scale of one to ten.").

[53] For example, in December 1998 – after being operational for just 10 months – one data CLEC proclaimed that it "will be able to provide DSL service to more business customers than all the Baby Bells combined." *NorthPoint Communications Will Surpass Combined Bells' DSL Deployment*, Bus. Wire (Dec. 15, 1998); *see also* J. Henry, *et al.*, Bear, Stearns & Co., Inc., Investext Rpt. No. 2748881, Global Telecommunications: Weekly Performance Review – Industry Report at *3 (Mar. 1, 1999) ("Rather than attempting to establish blanket coverage of each market served in order to provide the densest coverage for its wholesale customers, Rhythms seems intent on establishing the most dots on its national network map as soon as possible.").

piece of equipment – a Digital Subscriber Line Access Multiplexer (DSLAM). DSLAMs vary in price depending on their capacity, but average "well under $200" per customer line – an investment of just $3 per month per line for each customer (conservatively assuming a five-year customer retention rate).[54]

The DLECs did not even intend to provide their own facilities-based connections to the Internet. Instead, they enlisted hundreds of Internet Service Providers to take charge of that end of things. The DLECs themselves acted merely as wholesale brokers – obtaining the loop from an ILEC on one side, and a connection to the Internet through an ISP on the other. The DLECs opted not even to attempt to offer voice services, which would have enabled them to collaborate and share facilities with their sibling voice CLECs.[55] This strategy, the DLECs maintained, would let them grow very rapidly, on very small capital outlays.[56]

More than 20 DLECs began providing service between 1998 and the first quarter of 2000.[57] Nine completed successful initial public offerings (IPOs), raising more than $1.3 billion in capital. The DLECs that went public had been in operation an average of less than 3 years; they had few lines in operation (an average of only 1,545); and they had a very limited cadre of employees (an average of 273). *See* Table 4. The companies themselves routinely admitted that

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[54] D. Burstein, *DSL Prime News: The Inside Source*, CLEC-Planet (Oct. 2, 2001), http://www.clec-planet.com/tech/oct2dslprimea.html; *Broadband 2001* at 70 (cost of buying and operating a DSLAM at $174 per subscriber add); ZD Net, *ZD Net Shopper, Resellers*, http://zdnetshopper.cnet.com/shopping/resellers/0-11796-1411-403544-0.html (the Paradyne HotWire 8800 DSLAM 20 slot chassis – 48VDC costs around $4200 or $210 per slot); D. Burstein, *DSL Prime Newsletter*, CLEC-Planet (May 18, 2001), http://www.clec-planet.com/tech/0517dslprimea.htm ("[T]he primary costs involved [with provisioning DSL] are the shared line ($0-6 per month) and the DSLAM (whose price is under $200/ per line, or $4/month over five years).").

[55] As with ordinary Internet access service, DSL quickly became a commodity-like service, "due to the lack of differentiation in the levels of service and increased competition amongst Service Providers." Cisco Press Release, *Cisco Announces Industry's Most Comprehensive Portfolio of Customer Premises Equipment for Value-Added Business DSL Service* (Sept. 18, 2000). *See also* V. Grover, Kaufman Brothers, Investext Rpt. No. 2205121, Network Access Solutions Corp. – Company Report at *1 (June 28, 2000) ("DLECs . . . are now heavily exposed to commoditization of the access portion of their businesses because they do not own customer relationships and therefore cannot layer enhanced services onto their revenue streams."); V. Ryan, *Headed for a Fall?*, Telephone (Dec. 18, 2000) ("DSL wholesalers are trying to rescue customers from bankrupt ISPs and adapt to the commoditization of their primary business."); K. Higgins, *Intelligence at the Network Edge*, Network World at 41 (Aug. 21, 2000) ("customers . . . increasingly regard high-speed Internet access as a commodity. To compete successfully, DSL service providers must differentiate themselves by offering a range of value-added services, including multiline, toll-quality voice service; VPNs; frame relay; videostreaming; and emerging productivity and entertainment applications.").

[56] R. King, *Run Silent; Run Deep*, Tele.com at 70 (Apr. 1998) (quoting Covad's chairman stating that reliance on ISP important in order "to be able to roll the service out quickly and get the maximum amount of volume on our service that we can."); Rhythms NetConnections, Form 10-K405 at 7 (SEC filed Mar. 30, 2000) (relying on an ISP will "increase[] volume and reduce[] costs by serving multiple resellers and leveraging their selling efforts."); NorthPoint Communications Group, Form 10-K405 (SEC filed Mar. 30, 2000) (relying on ISPs would "enabl[e] [its] sales force to focus on prospective high-volume wholesale customers; amortize the cost of [its] fixed capital expenses over large base of end users more rapidly; minimize [its] end user support costs; and achieve a nationwide presence more quickly.").

[57] An additional 18 traditional CLECs also began offering DSL services during this period.

their business models and strategies were "unproven"[58] and had not been "validated . . . in the market."[59]

Table 4. Operating Statistics for Public DLECs at Time of IPO						
	Date of IPO	**Funds Raised by IPO**	**Employees**	**Annual Revenue**	**Annual Losses**	**DSL Lines in Service**
Choice One	02/16/00	$164M	390	$11.7M	$34M	206
Covad	01/22/99	$150M	335	$2.6M	$28M	1,948
DSL.net	10/12/99	$50M	146	$184,000	$6.5M	463
Log On America	04/22/99	$25M	13	$760,000	$422,000	n/a
Mpower	05/15/98	$63M	145	$3.8M	$10.8M	0
Net2000	03/10/00	$212M	485	$28M	$39M	n/a
NAS	06/03/99	$82M	141	$4.8M	$2.5M	300
NorthPoint	05/05/99	$386M	423	$931,000	$29M	5,700
Rhythms	04/12/99	$210M	400	$528,000	$36M	650
Sources: See Appendix M.						

Then, between March and December 2000, the Internet bubble burst. The nine publicly traded DLECs lost more than 94 percent of their stock-market value. Industry insiders attributed this to the DLECs' "unsound business models," their failure to "own the physical layer," and their decision to "run[] on another firm's network."[60]

The failed DLECs were eventually absorbed by more successful CLECs, often at a bargain price. AT&T and WorldCom acquired the two largest failed DLECs – NorthPoint and Rhythms; several other DLECs were likewise acquired by successful CLECs.[61] Significantly, in

[58] NorthPoint Communications, Form S-1 (SEC filed Feb. 26, 1999).

[59] Rhythms NetConnections, Form S-1 (SEC filed Feb. 16, 1999).

[60] L. LaBarba, *Who's Saving Whom?*, Telephony (Dec. 18, 2000) (quoting Russ Intravartolo, CEO of ISP wholesaler Starnet: "There is no profitable way into DSL unless you own the physical layer."); *id.* (quoting Gary Steele, vice president of product development for PathNet: "What's going on in the industry may not be consolidation as much as it is the death of unsound business models."); M. Martin, *Caution Flags Flying as CLEC Woes Mount*, Network World (Nov. 20, 2000), http://www.nwfusion.com/news/2000/1120clec.html (quoting Current Analysis analyst Jeff Moore: "It's hard to be profitable when you're running on another firm's network."); *Regional DSL Report: Boston*, ISP Planet (Dec. 15, 2000), http://www.isp-planet.com/news/dsl_report_boston.html (quoting Vitts CEO and Chairman: The DSL providers "adhere[d] to business plans resembling those of failed dot-com retailers: grow big and fast, no matter the cost of 'buying' customers."); S. Woolley, *Highway to Hell*, Forbes (Feb. 19, 2001) ("The whole structure made zero sense from an economic standpoint.").

[61] *See*, *e.g.*, WorldCom Press Release, *WorldCom Closes Rhythms Transaction* (Dec. 5, 2001) (WorldCom acquired the assets of Rhythms NetConnections for $31 million. The deal was closed approximately one month in advance, resulting in a more than 20 percent reduction in acquisition cost.); AT&T News Release, *AT&T Acquires Assets of NorthPoint Communications* (Mar. 22, 2001) (AT&T acquired "substantially all of the assets of NorthPoint Communications" for approximately $135 million. "We are delighted to be acquiring NorthPoint's DSL assets," said Robert M. Aquilina, co-president of AT&T Consumer. "They will help us in our efforts to move aggressively to bring the full benefits of DSL to consumers and businesses. These benefits include high-speed Internet access, local and long distance calling, and exciting broadband services, including virtual private networks, among other possibilities, in the future."); Cavalier Telephone Press Release, *Cavalier Telephone Completes Purchase of Net2000 Communications*

some of these cases, the acquiring CLEC took only the assets of the failed DLEC – primarily collocation space – not its customers.[62] If they had viewed "rapid" and "ubiquitous" entry as the keys to the competitive success, the acquiring companies would presumably have done just the opposite.

C. Anti-Competitive Impacts of Expanding UNEs into Competitive Markets.

While the unbundling regime was intended to promote competition for local exchange services,[63] both interexchange carriers and wireless carriers have demanded that ILECs also unbundle the inputs used in the provision of long distance and wireless services. These complementary markets are already competitive in their own right. Extending unbundling into these markets is, therefore, not only unnecessary to assure continued competition in those markets, but also likely to undermine the competitive supply of facilities that already has emerged for the local inputs in these markets.

1. Conversion of Special Access Circuits to UNEs.

"Special access" is the name given to "a variety of services and facilities which constitute the local portion of certain interstate telecommunications lines."[64] Special access "primarily involves the provisioning of so-called 'private lines,' that is, facilities or network transmission capacity dedicated to the use of an individual customer."[65] These dedicated facilities typically "run directly between the end user and the [interexchange carrier's] point of presence (POP),"[66] or directly between two end-user locations. When ILECs provide special access circuits to interexchange carriers, the ILECs must typically build those circuits from the ground up, using a combination of local loops and interoffice transport.

The customers for special access "are IXCs and large businesses, not residential or small business end users."[67] In fact, between 78 and 89 percent of the special access revenue earned

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(Jan. 21, 2002) (Cavalier Telephone acquired the assets and customer lines of Net2000 in Virginia, Maryland, and Washington, D.C.; Broadview will acquire Net2000's assets in New York and Boston).

[62] *See*, *e.g.*, J. Borland, *AT&T Buys NorthPoint Assets*, CNET News.com (Mar. 22, 2001), http://news.com.com/2100-1033-254629.html?legacy=cnet ("AT&T is not taking over NorthPoint's customers along with the network.").

[63] *UNE Remand Order* ¶ 5 ("We continue to believe that the ability of requesting carriers to use unbundled network elements, including various combinations of unbundled network elements, is integral to achieving Congress' objective of promoting rapid competition to all consumers in the local telecommunications market."); *id.* ¶ 9 ("The unbundling standards we adopt in this Order [] seek to encourage the rapid introduction of competition in all markets.").

[64] *Investigation of Special Access Tariffs of Local Exchange Carriers*, 8 FCC Rcd 4712, ¶ 2 (1993).

[65] *Id.*

[66] *Pricing Flexibility Order* ¶ 8.

[67] *Pricing Flexibility Order* ¶ 142. *See also WorldCom v. FCC*, 238 F.3d. 449, 453 (D.C. Cir. 2001) ("Most users of special access services are companies with high call volumes."); Corrected Brief for Federal Communications Commission at 4, *WorldCom v. FCC*, No. 99-1395, *et al.* (D.C. Cir. filed Sept. 12, 2000) ("Because special access services employ dedicated facilities, special access is typically used by IXCs and large businesses with high traffic volumes."); Brief of MCI WorldCom, Petitioners and Supporting Intervenors at 3-4, *WorldCom v. FCC*, No. 99-1395, *et al.* (D.C. Cir. filed Sept. 8, 2000) ("Special access, used generally by business customers who have a high volume of

by BellSouth, Qwest, SBC, and Verizon is generated from DS-1 circuits or above (*e.g.*, DS-3, OC-3).[68] And as the Commission has recognized, DS-1 circuits "are primarily used by business customers."[69]

The largest purchasers of special access service are interexchange carriers, which use special access to transport large volumes of traffic to and from their largest business customers.[70] Between 56 and 76 percent of the special access revenue earned by BellSouth, Qwest, SBC, and Verizon is generated by interexchange carriers. The Commission has noted that long distance carriers "typically provide resold special access and private line services as part of toll service operations."[71]

Special access traffic is also highly concentrated, geographically. In each of the BOC regions, the vast majority of special access revenue is generated in a very small minority of wire centers.[72]

The special access market is already highly competitive. It was among the first to be opened to competition, and it has attracted large numbers of competitors because of the extremely large traffic volumes that it involves. The only economic argument for permitting the

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calls, is accomplished 'via a private, dedicated line…running from the customer to the IXC' . . . By contrast, switched access connections are generally used by residential customers and other customers with lower traffic volumes.") (internal citations omitted).

[68] USTA, *Competition for Special Access Service, High-Capacity Loops, and Interoffice Transport*, CC Docket No. 96-98, at 2 & Table 1 (FCC filed Apr. 5, 2001).

[69] *See*, *e.g.*, *Second Advanced Services Report* ¶ 99.

[70] The big three interexchange carriers are not only the largest purchasers of special access service from incumbent LECs, but also major self-suppliers of special access. AT&T and WorldCom, for example, each has local facilities in approximately 100 markets that likely are used to provide special access services. *See NPRG CLEC Report 2002, 15th ed.*, Ch. 6 – WorldCom at 13, 18 & AT&T at 19, 24. Sprint has stated that it is deploying local fiber rings in "20 major U.S. markets" that allow "improved access economics," and enable Sprint "to significantly reduce its special access costs." Sprint News Release, *Sprint Announces Financial Targets and Growth Strategies* (Nov. 3, 2000). Other long distance providers – including Williams, Level 3, and Global Crossing – likewise have extensive local facilities that they use to self-provide special access services. *See*, *e.g.*, C. Grice, *Williams to Expand High-Speed Network into 50 Cities,* News.com (Feb. 10, 2000), http://news.cnet.com/news/0-1004-200-1546995.html?tag=st (Williams "expects to spend $421 million over three years in order to link its proposed 33,000-mile fiber-optic 'backbone' network directly to business customers in the nation's largest cities."); Level 3 Communications, *The Level 3 Network*, http://www.level3.com/673.html (Level 3 has 57 markets in service and almost 16,000 miles of conduit in North America); Global Crossing Press Release, *Global Crossing Reports 2000 Pro Forma Cash Revenue up 36%, Recurring Adjusted EBITDA up 54% from 1999* (Feb. 14, 2001) (in 2000, Global Crossing completed metro rings in 10 cities in the United States: New York, Philadelphia, Washington D.C., Atlanta, Miami, Dallas, Chicago, San Francisco, San Jose, and Los Angeles).

[71] FCC, *Local Telephone Competition at the New Millennium* at Table 6, note **** (Aug. 2000).

[72] More than 80 percent of SBC's special access revenues are generated in less than 25 percent of the wire centers in which it is providing special access. In Verizon's region, more than 80 percent of special access revenues are generated from about 20 percent of Verizon's total wire centers. In Qwest's region, more than 60 percent of special access revenues are generated from 11 percent of Qwest's total wire centers. In BellSouth's region, 91 percent of special access revenues are generated from 20 percent of BellSouth's total wire centers. USTA, *Competition for Special Access Service, High-Capacity Loops, and Interoffice Transport*, CC Docket No. 96-98, at 3 (FCC filed Apr. 5, 2001).

conversion of special access circuits into UNEs is that it would supposedly reduce the costs of the inputs that interexchange carriers use in the provision of long distance services. But as the Commission has recognized, the long distance market already is competitive for large business customers that are the primary end-users served with special access circuits.[73] Any regulatory action that merely reduces the prices that one of the competitive suppliers of special access may charge is, therefore, unnecessary to promote long distance competition.

Any such action would devalue the assets of other competitive suppliers in this market. CLECs as a group are more significant suppliers of special access service than basic local exchange service. As the Commission has found, "the revenues of competitive LECs come primarily from special access and local private line services."[74] CLECs now account for between 28 and 39 percent of all special access revenue, *see* Appendix L, which is significantly larger than their share of the local exchange market as a whole.[75] CLECs have obtained fiber-based collocation in wire centers that contain a significant share of BOC special access revenues.[76]

2. Conversion of Transmission Services for Wireless Carriers.

Some wireless carriers suggest that CMRS base stations are equivalent to ILEC end offices, and that wireless carriers are therefore entitled to buy "interoffice transport," at UNE rates, between various points on their networks.

Wireless carriers clearly do not need access to transport UNEs to compete in wireless markets themselves. The 1996 Act authorized ILEC wireless affiliates to enter long-distance markets immediately, without waiting for any unbundling or section 271 checklist approval by their wireline affiliates.[77] As the Commission's sixth annual report ("*Sixth CMRS Report*") on competition in Commercial Mobile Radio Services (CMRS) concluded in December 2001, U.S. wireless markets are robustly competitive, and growing more so year by year.[78] While ILEC

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[73] *See Revisions to Price Cap Rules for AT&T Corp.*, Report and Order, 10 FCC Rcd 3009, ¶¶ 16-18 (1995); *see also Motion of AT&T Corp. to be Reclassified as a Non-Dominant Carrier*, Order, 11 FCC Rcd 3271, ¶¶ 88-90 (1995).

[74] *See*, *e.g.*, *Promotion of Competitive Networks in Local Telecommunications Markets*, First Report and Order and Further Notice of Proposed Rulemaking in WT Docket No. 99-217, Fifth Report and Order and Memorandum Opinion and Order in CC Docket No. 96-98, and Fourth Report and Order and Memorandum Opinion and Order in CC Docket No. 88-57, 15 FCC Rcd 22983, ¶ 24 (2000).

[75] *See* Section I.D.

[76] *See* USTA, *Competition for Special Access Service, High-Capacity Loops, and Interoffice Transport*, CC Docket No. 96-98, at 6-7 (FCC filed Apr. 5, 2001) (In 183 of the 320 MSAs served by BellSouth, Qwest, SBC, and Verizon, one or more fiber based collocation arrangements existed in wire centers that cover at least 30 percent of the incumbent LECs' special access revenues in those MSAs. In 154 of these MSAs, one or more collocation arrangements exist in wire centers that cover at least 65 percent of the incumbent LEC's special access revenues in those MSAs.).

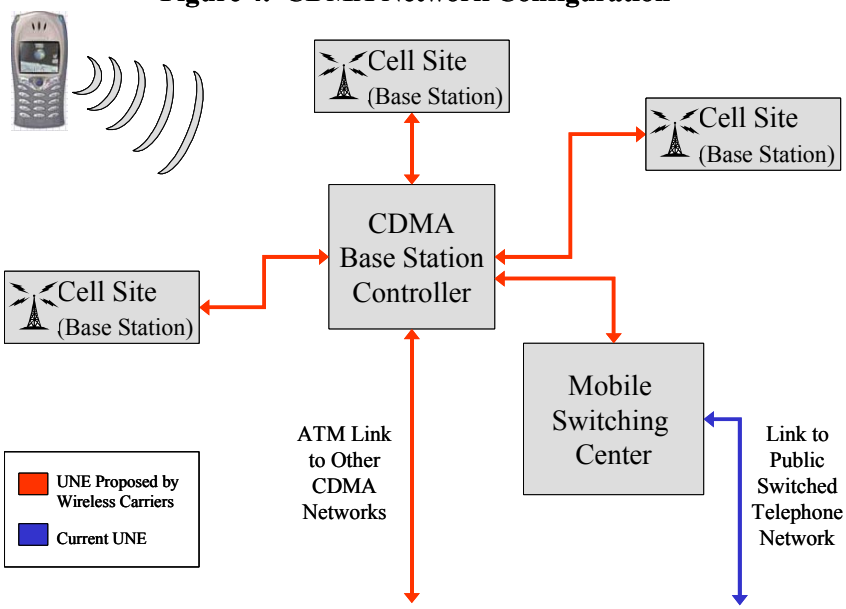
[77] 47 U.S.C. § 271(g)(3).

[78] *See*, *e.g.*, *Sixth CMRS Report* 4-5 ("In the year 2000, the CMRS industry continued to experience increased competition and innovation as evidenced by lower prices for consumers and increased diversity of service offerings."). The Commission cited that the "continued downward price trends, churn, and continued expansion of mobile networks

affiliates rank as robust competitors in wireless markets, unaffiliated wireless carriers are more than holding their own. Approximately 40 percent of the wireless market is served by carriers that are not affiliated with any ILEC.[79]

Wireless networks consist of four basic tiers. *See* Figure 4.[80] The first three tiers define the *wireless* tier of the wireless carrier's network; the fourth tier both switches wireless calls and hands them off to and from the wireline network.[81] All of the true switching is performed at the fourth level.

Figure 4. CDMA Network Configuration



The base station is not a switch – its purpose is to allocate a shared resource – wireless bandwidth – among multiple users of the network who aren't all using their wireless phones at the same time. It is the *mobile switching center* – not the base station itself – that orchestrates the intra-switch hand off when a user moves away from base station A and toward base station B. And likewise for the hand-off required when the user moves on toward a more distant base station C, which is connected to an entirely different switch. The switches themselves are linked to an ATM network that is there to support these "soft," inter-switch handoffs of live calls. The base station plays no more role in orchestrating the hand off than the wireless handset does – all of these tiers of the network remain under the direction and control of the switch. And in any

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into new and existing markets demonstrate a high level of competition for mobile telephony customers. . . . Most carriers report churn rates between 1.5 percent and 3 percent per month. . . . According to one recent survey, almost one in five wireless subscribers have switched carriers in the past year." *Sixth CMRS Report* at 21, 23.

[79] *See Legg Mason Wireless Industry Scorecard* at Exh. 8 (estimated market share as of 3Q 2001).

[80] *See* Nortel Networks, *Products and Services, CDMA Networks*, http://www.nortelnetworks.com/products/01/cdma/index.html#.

[81] *See* Nortel Networks, *The DMS-100 Wireless System* at 3, Document No. 50171.16/10-97 Issue 1.

event, the hand-offs themselves are not equivalent to switching; they occur to support efficient use of radio spectrum in a cellular architecture network, not the routing of calls between end-users.

3. Conversion of Broadband Services for Information Service Providers.

The provision of information services is highly competitive, and has been deregulated for more than 30 years. While information services providers sometimes use parts of the local exchange network to provide service to end users, they do so by obtaining tariffed services from ILECs. The 1996 Act makes clear that UNEs cannot be used to provide an information service.[82]

CLECs have nonetheless attempted to insert themselves between ILECs and information services providers by converting tariffed customer services into UNE-centered services. Various CLECs have obtained UNEs to provide connections between end-user customers and those customers' ISPs. This is what data CLECs like Covad do with respect to broadband Internet access. The CLEC in this scenario is typically little more than a regulatory fiction – a device to use a particular regulatory classification to obtain UNE-based "carrier" connections and prices lower than those available to mere "customers." The CLEC adds little if any value of its own.

The extension of UNEs into the information services realm is surely not necessary to promote competition for these services. Competition has evolved rapidly without such UNEs. For example, there are now more than 7,000 providers of narrowband Internet access, and the Bell companies collectively provide service to fewer than 6 percent of the subscribers to these services.[83] Nor is the extension of UNEs to serve ISPs necessary to promote competition in the broadband market. As discussed in Section IV.C, the provision of broadband services is already highly competitive.

D. Facilities-Based Investment in New Broadband Infrastructure.

The "widespread deployment of broadband infrastructure has become the central communications policy objective of the day." This will require "the complete or near-complete replacement of copper lines with end-to-end fiber optic transmission facilities."[84] To promote the objective, "broadband services should exist in a minimal regulatory environment that promotes investment and innovation in a competitive market."[85]

Manufacturers of computers and other types of hardware that use bandwidth are all but unanimous in their view that – as Intel CEO Craig Barrett puts it, "broadband" only "gets exciting when you get to 5 megabits per second or even 100 mbps."[86] What ranks as

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[82] *See* 47 U.S.C. § 251(c)(3).

[83] *See* P. Fusco, *Top U.S. ISPs by Subscriber: 2001 Year End*, ISP-Planet.com (Feb. 11, 2002), http://www.isp-planet.com/research/rankings/usa.html.

[84] *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, Notice of Proposed Rulemaking, 17 FCC Rcd 3019, ¶¶ 1, 12 (2002).

[85] *Id.* ¶ 5.

[86] J. Shiver, *Intel CEO Makes Case for Broadband Aid*, L.A. Times (Jan. 28, 2002).

"broadband" today "is not sufficient to provide some of the serious content people are interested in."[87] Surveys already confirm that consumers who obtain broadband connections use the Internet more, not less.[88] Higher speed connections don't merely accelerate – and thus shorten – connections – they immediately lead to new uses and thus, *longer* connections.[89] As the Commission recognized in its *First Advanced Services Report*, broadband links become part of a self-reinforcing "virtuous cycle," in which better performance and lower per-bit price "fuels more demand" – heavier use of existing applications, and, more importantly, "demand for new applications that were not feasible before."[90] "As the cycle gains momentum . . . companies will provide new applications and services for broadband consumers, . . . consumers will demand broadband, and the virtuous cycle will accelerate."[91] *See* Table 5.

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[87] *Id*. As Intel has stressed, "the true benefits of broadband will require faster transmission speeds" – "at only 200 kbps, 'advanced services' are not capable of providing adequate transmission speeds for video." Comments of Intel Corp. at 5, *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996*, CC Docket No. 98-146 (FCC filed Sept. 24, 2001). "High-definition video requires 19.8 Mbps; DVD-quality video needs almost 4 Mbps; and even television quality requires 750 kbps or more. In fact, 'many experts set 100 Mbps as the frontier [of the Web's true potential for] general surfing to streaming high-quality, skip-free digital audio and video, as well as faster upload of graphic images and larger files.'" *Id.* Corning likewise has suggested that "[a] minimum transmission speed of 10 mbps upstream and downstream should be utilized for the purpose of defining next generation broadband capability. . . . This speed is necessary to allow for the bi-directional transmission of audio, data at 10 base-T Ethernet speeds, and compressed full motion video." Comments of Corning Inc., *Deployment of Broadband Networks and Advanced Telecommunications*, Docket No. 011109273-1273-01 (NTIA filed Dec. 19, 2001). But Corning stressed that "10 mbps is a minimal level of transmission," that the range really extends from 10 mbps to 1 Gbps. *Id.* Corning senior vice president Timothy Reagan told the House Energy and Commerce Committee that "[i]f you think that Americans will need access to information in all its forms – audio, video, and data – it is easy . . . to see that a capability in excess of 22 [Mbps] downstream and 10 [Mbps] upstream is ideal." Timothy Regan, Senior Vice President, Corning Inc., prepared witness testimony before the House Energy and Commerce Committee, Washington, D.C. (Apr. 25, 2001).

[88] *See*, *e.g.*, *Broadband 2001* at Charts 16 and 17 (as broadband users, survey participants spent on average 21.4 hours per month online, as compared to 15.9 hours with a narrowband connection. These same users also spent more time per session (32 minutes vs. 21 minutes), spent more days online (18 vs. 17) and viewed more pages per month (1,828 vs. 1,561)); Jupiter Media Metrix Press Release, *Over 40 Percent of US Online Households to Connect Via Broadband by 2006, Reports Jupiter Media Metrix* (Oct. 17, 2001) ("Broadband consumers continue to use their connections more intensively than narrowband consumers do…").

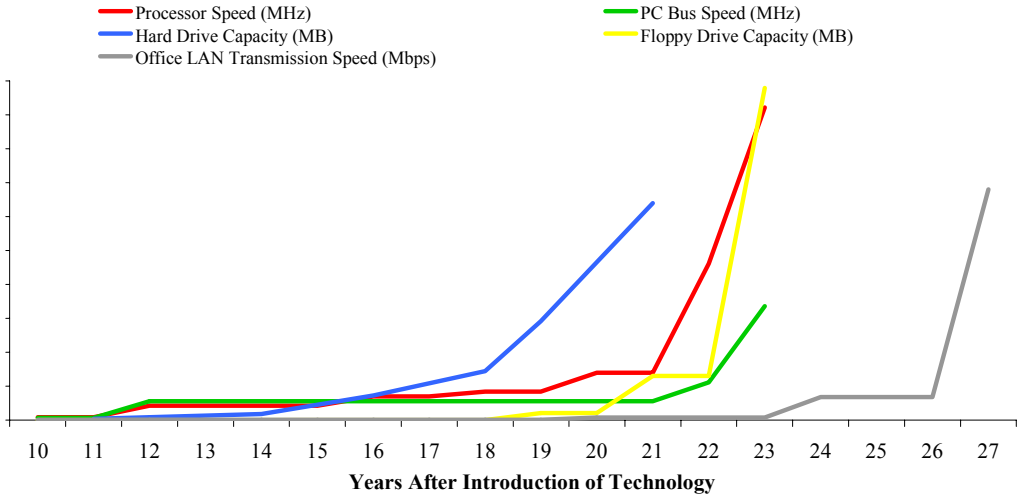
[89] According to a Broadband Watch study, customers are using broadband to engage in online activities such as shopping online (95 percent), e-mailing photos (76 percent), downloading streaming video (64 percent), downloading MP3s (61 percent), telecommuting (60 percent), creating Web pages (49 percent) and playing games (47 percent). Respondents also reported that with DSL, they are much more likely to engage in these higher-bandwidth activities: downloading MP3s: 61 percent with DSL vs. 35 percent with dial-up; downloading video: 64 percent with DSL vs. 36 percent with dial-up; and e-mailing photos: 76 percent with DSL vs. 62 percent with dial-up. *See Survey Says: DSL Users "Addicted" to Broadband*, Bus. Wire (Apr. 3, 2001). *See also* Jupiter Media Metrix Press Release, *Over 40 Percent of US Online Households to Connect Via Broadband by 2006, Reports Jupiter Media Metrix* (Oct. 17, 2001) ("Broadband users are more likely than dial-up users are to download music (46 percent of broadband users, 26 percent of dial-up users), listen to music (48 percent and 30 percent, respectively) and watch video (36 percent and 18 percent, respectively). . . . [M]ore broadband consumers conduct personal banking (48 percent and 30 percent, respectively) and stock-related activities online (35 percent and 23 percent, respectively) than dial-up consumers do.").

[90] *First Advanced Services Report* ¶ 95.

[91] *First Advanced Services Report* ¶ 96.

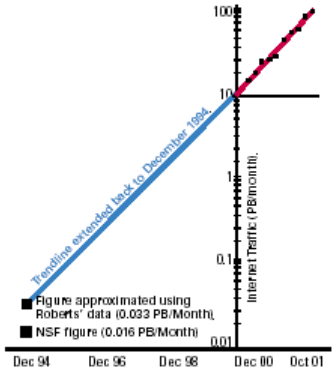
Table 5. Emerging Broadband Applications		
Application	**Minimum Speed**	
Next-Generation Game Consoles (*e.g.*, Microsoft Xbox)	200 kbps	"You need to have a broadband connection . . . to use the Xbox online service." "Broadband access makes possible an explosion of multiplayer games."
Online Gaming	200 kbps	"As broadband connections become more standard, the online gaming industry is poised to deliver gaming experiences that are more enjoyable and exciting than anything we have seen so far."
Downloading Music	200 kbps	"Most MP3 files are between 2MB and 5MB in size. Downloading that much data through a narrowband pipe is horribly tedious, especially if you're trying to build an extensive music library on your hard drive. But with cable, DSL, or satellite, the tunes reach your hard drive in a relative flash."
Internet Radio	200 kbps	"Though [Internet radio] is possible with a dialup connection, it doesn't work so well because the signal often gets clogged in the narrow pipe. But with broadband, the music or talk usually reaches your ears as it was originally sung, played, or spoken."
Telemedicine – Distance Diagnosis	384 kbps	"The majority of [distance] diagnoses could be determined using [a] 384 kbps link, with slight improvement when the bandwidth was increased to 1 mbps."
Distance Learning	384 kbps	"H.320 [the lowest speed distance-learning standard] provides high-quality images at any speed from 384 Kbps and up."
Video-on-Demand (*e.g.*, Microsoft/ CinemaNow's PatchBay)	500 kbps	"[V]ideo-on-demand will remain out of reach for most U.S. households in the near future, including all homes using dial-up internet access and even the vast majority of broadband households."
Streaming Video	600 kbps	"[A] minimum 600-Kbps and maximum 800-Kbps video stream to each modem [is] enough to provide each user half a computer screen of 'TV-quality' video synched with its audio at all times."
Full-Length Video Downloads	1 Mbps	"Downloading a full-length feature over a fast broadband connection at 1 mebabit per second (Mbps) takes about 30 minutes. Over a slow broadband connection of 128 kilobits per second (Kbps), it could take hours."
Videoconferencing	1.5 Mbps	"The target for videoconferencing is 30 fps (broadcast quality) but requires bandwidth in the range of 1.5 mbps."
Telesurgery	10 Mbps	For a recent telesurgery by a doctor in New York on a patient in France, France Telecom "needed to guarantee 10 Mbps and continuous transmission delays of less than 200 milliseconds, on both inbound and outbound links."
Sources: See Appendix M.		

Figure 5. Increase in Speed/Bandwidth of Various Technologies



Sources: See Appendix M.

Figure 6. Internet Backbone Traffic Growth



Source: Gilder Technology Report. See Appendix M.

From the consumer's perspective, demand for bandwidth – raw digital capacity and speed – has been rising very fast for the last decade – just as demand for speed and capacity in all the hardware that links up to the digital networks as been rising inexorably for the past two decades. *See* Figures 5 & 6. What ranks as "broad" today no longer will a few years hence. Most of the applications that will generate data traffic five years hence aren't running today, at least not in any way comparable to what they will become. Most of the users of "broadband services" today aren't yet using those services for what they will be using them for in the fairly near future. Most of today's "broadband" infrastructure, both wired and wireless, will have to be upgraded again and again, indefinitely into the future, to meet the continuous rise in demand.

Many residential applications are now emerging, from high-speed games to telecommuting to telemedicine, that will push residential consumers toward symmetric broadband services. As the chief of the Commission's Media Bureau recently observed, "current generation 'broadband' networks cannot support . . . killer apps, the predecessors of which are

staring us right in the face."[92] Such applications will require "next generation of broadband network – one that presumably will be symmetrical, or nearly so, and capable of delivering perhaps ten megabits per second."[93]

As the Commission itself recently concluded, much of the copper distribution plant will have to be replaced with fiber.[94] One analyst estimates that "modernizing our wireline access infrastructure will likely cost over $200 billion from start to finish," and that this investment will have to be made "without a firm grasp of what services will be demanded and at what price they will be purchased."[95]

Wireless broadband services are coming, too. A number of U.S. CMRS carriers have already deployed 2.5G[96] services which allow users to access the Internet at speeds up to 144 kbps, a significant improvement over widely deployed 2G services, with top speeds around 10 kbps.[97] 3G networks will be needed for true broadband.[98] Although the FCC has yet to allocate additional spectrum specifically for 3G wireless services, a number of companies already are in the process of deploying 3G networks over their existing spectrum. Verizon Wireless recently launched its 3G service in markets covering one-third of the company's national footprint.[99]

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[92] W. Kenneth Ferree, Chief, Cable Services Bureau, FCC, *How* Do *You Build the Information Superhighway?*, remarks at the Broadband Outlook 2002 Conference (Jan. 23, 2002).

[93] *Id*.

[94] *See Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, Notice of Proposed Rulemaking, ¶ 12, CC Docket No. 02-33, FCC 02-42 (rel. Feb. 15, 2002) ("[t]he logical technological evolution of the network is the complete or near-complete replacement of copper lines with end-to-end fiber optic transmission facilities."); *see also* I. Burgess, Credit Suisse First Boston, Investext Rpt. No. 2989479, European Telecom Equipment Weekly Update - Industry Report at *4 (Nov. 12, 1999) ("Ultimately the limitations of copper cable ensure that the economic solution is to push fibre deeper and deeper into the network, closer and closer to the user."); M. Suydam, *Passive Aggressive*, CommVerge at 40 (May 1, 2001) ("[Passive Optical Networking] is obviously much better than copper. While DSL is hot today, how long will that last? Eventually, everything will go into fiber.") (quoting Dong Liu, strategic marketing manager for networking and interface products, Agere Systems).

[95] Douglas Ashton, Bear Stearns and Co., prepared witness testimony before the House Energy and Commerce Committee, Washington, D.C. (Apr. 25, 2001).

[96] *See Sixth CMRS Report* at 48 ("the term 2.5G is used to describe the interim technologies that carriers will use while migrating from their current 2G technologies in order to offer mobile data services at higher speeds.")

[97] Carriers who have deployed 2.5G services include VoiceStream, Cingular Wireless, and AT&T Wireless. *See Legg Mason Wireless Industry Scorecard* at 28; 3G Newsroom.com, *What Is 3G?*, http://www.3gnewsroom.com/html/what_is_3g/index.shtml (updated Nov. 18, 2001).

[98] *See*, *e.g.*, J. Haring, H. Shooshan, and K. Pehrsson, Strategic Policy Research, *White Paper on Elimination of the Spectrum Cap* at 6 (Apr. 12, 2001) *attached to* Comments of Cingular Wireless LLC in *2000 Biennial Review Spectrum Aggregation Limits for Commercial Mobile Radio Services*, WT Docket No. 01-14 (FCC filed Apr. 13, 2001) ("3G services will provide the advantages of allowing internet browsing on the move, and will be 'always on' – *i.e.*, no need to establish a network connection each time the user wants to receive e-mail or surf the web.").

[99] Verizon Wireless Press Release, *Verizon Wireless Launches Nation's First Major Advanced Wireless Network: The Verizon Wireless Express Network* (Jan. 28, 2002); Verizon Wireless Press Release, *Verizon Wireless Introduces Express Network to Key U.S. Cities in the Midwest, South, Northeast and the Pacific Northwest* (Apr. 2, 2002).

Sprint PCS is expected to follow within the first half of 2002.[100] Analysts predict that 3G networks will be widely deployed by 2004 or 2005.[101]

The Commission also has recently taken the first steps to "pave the way for new types of products incorporating ultra-wideband (UWB) technology"[102] – devices that "can operate using spectrum occupied by existing radio services without causing interference,"[103] and to explore the introduction of "software defined radio" (SDR) technology that could allow a single device to be quickly reprogrammed to transmit and receive on any frequency within a wide range using virtually any transmission format.[104] There also are a host of other technologies currently under development that will be capable of provisioning wireless broadband services. These include Digital SMR, 2 GHz MSS satellite systems, L-Band satellites, and Big LEO satellites.

The strongest incentive 3G carriers and other wireless carriers have today to accelerate the roll out of their broadband wireless services is to capture from incumbent cable operators and ILECs a share of the profitable ($40-$50 per month) broadband subscription fees. A UNE policy that promotes uneconomic competition over the high-frequency portion of the ILEC loop, based on excessively discounted TELRIC prices, will surely depress investment in the high-frequency portions of the airwaves themselves.

Finally, the Commission has recognized that fixed wireless access offers "a replacement for the 'last mile' of copper wire."[105] Recent advancements in fixed wireless technologies are expected to "cause a spur in service provider deployments."[106] In particular, Non-Line-of-Sight

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[100] *See* B. Chamy, *VoiceStream Launches New Phone Network*, CNET News.com (Nov. 14, 2001), http://news.com.com/2100-1033-275853.html?; *see also Sixth CMRS Report* at App. D, Tables 1 & 2 (showing the various 3G contracts and tests/trials already underway in the U.S.).

[101] *See*, *e.g.*, *IDC Wireless Displacement Report* at 20 (By the 2003-2004 timeframe, 2.5G and 3G end-user terminals . . . are expected to be available in mass market quantities."); P. Jarich and R. Haley, Strategis Group, *Fixed Wireless: The Emerging Vendor Landscape* at 208 (Nov. 2001) ("U.S. carriers are planning to deploy high-speed mobile networks as early as year-end 2001…. the 2004-2005 timeframe is seen to be pivotal for the development of the 3G market."); T. Robillard, Salomon Smith Barney, Investext Rpt. No. 2421674, 3G Odyssey: Infrastructure the Opportunity; Timing the Risk – Industry Report at *1 (Jan. 3, 2001) ("We believe 2G capacity driven spending will represent majority of [revenues] in 01 and 02 while 3G should add to sales and is unlikely to represent majority of [infrastructure revenues] until late 03/early 04."); F. Marsala, Robertson Stephens, Investext Rpt. No. 8245695, Implications of Cingular's Technology Announcement – Industry Report at *1 (Oct. 31, 2001) ("[AT&T Wireless] currently plans to deploy third-generation W-CDMA (also called UMTS) beginning in 2003").

[102] *Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission Systems*, Public Notice, 15 FCC Rcd 12086 (2000).

[103] FCC News Release, *New Public Safety Applications and Broadband Internet Access Among Uses Envisioned by FCC Authorization of Ultra-Wideband Technology* (Feb. 14, 2002); *id.* (these devices will permit "scarce spectrum resources to be used more efficiently.").

[104] *See Inquiry Regarding Software Defined Radios*, Notice of Inquiry, 15 FCC Rcd 5930 (2000); *Authorization and Use of Software Defined Radios*, First Report and Order, 16 FCC Rcd 17373 (2001).

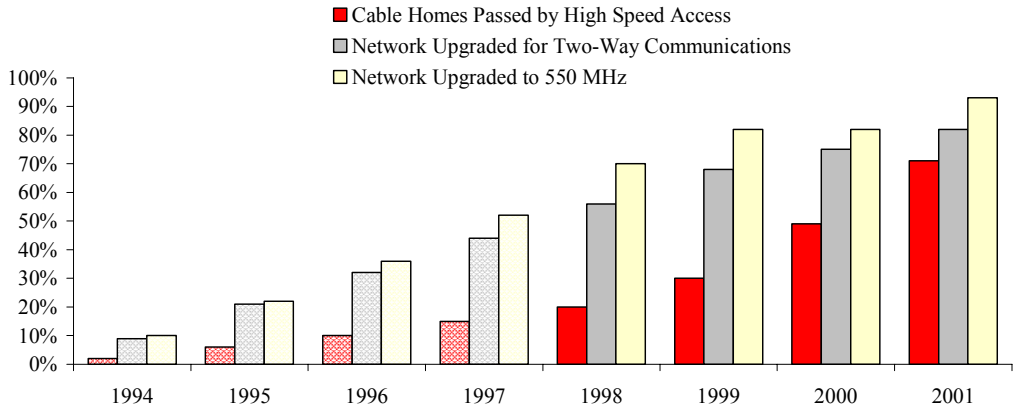
[105] *Third CMRS Report*, App. F at F-1.

[106] *See Yankee Group Fiber and Fixed Wireless Report* at 13; M. Helgeson, Dain Rauscher Wessels, *Broadband Wireless: The Worldwide Assessment* at 4 (May 17, 2001) ("With NLOS we believe at least 25% more customers can be served within the same geographical footprint. We further believe that this could mean the difference in convincing service providers to put their money into deploying the technology en masse."); C. Riggle, *Next-Generation NLOS Fixed Wireless – An NLOS Case Study*, Broadband Wireless Online (Sept. 2001),

technologies have been developed, which obviates the need for an unobstructed path between a fixed wireless transmitter and an end-user premises.[107] In addition, "[t]he incorporation of IP-based telephony capabilities in second-generation NLOS equipment will allow MMDS providers to incorporate voice applications in their service mix."[108] This is expected to prompt fixed wireless providers "to target the residential end users, thereby increasing fixed wireless availability and hence subscriber base."[109]

The Commission also has recognized that the new broadband infrastructure, both wired and wireless, will be rolled out incrementally. Network deployments are "complex and time-consuming projects that require enormous capital expenditures, a skilled labor-force, and available supply of advanced equipment."[110] As a result, even incumbent network operators "cannot upgrade all of their systems simultaneously," but instead "upgrades are a multiyear and multiphase endeavor, whereby the operator upgrades certain systems and offers new services on an incremental basis."[111] *See*, *e.g.*, Figure 7.

Figure 7. Cable Network Upgrades*



*Shaded columns represent estimated status of upgrades.

Sources: See Appendix M.

http://www.shorecliffcommunications.com/magazine/volume.asp?vol=20&story=182 ("[W]ith the recent availability of NLOS wireless solutions, MMDS carriers have a renewed competitive opportunity. MMDS carriers can deploy their networks faster and thus are positioned to capture market share from cable and DSL access providers."); B. Harter, *Is Market-Changing BWA Technology in Sight?*, Broadband Week (May 7, 2001), http://www.broadbandweek.com/news/010507/010507_wireless_tech.htm. ("A recent [Allied Business Intelligence] report calls NLOS technologies a key component in the growth of multichannel multipoint distribution services-based networks.").

[107] *Yankee Group Fiber and Fixed Wireless Report*.

[108] *Id.* at 11.

[109] *Id.* at 8.

[110] *AT&T/MediaOne Order* ¶ 150.

[111] *Id.*

Unfettered competition is almost always the best policy when markets are young, and when technology is evolving quickly.[112] And that is certainly the condition of the broadband market today. Most of the market is up for grabs, because 90-plus percent of the technology that will ultimately be used hasn't yet been built, 90-plus percent of the capital hasn't yet been committed, and 90-plus percent of the customers aren't yet being served. And because broadband digital services will ultimately absorb and displace the old, analog voice and video, it is equally true that no player in the market today has any assurance of winning any given share of the vast digital market ahead. An extraordinary transformation in technology is overtaking all the old certainties.

[112] *See*, *e.g.*, Michael Powell, Chairman, FCC, remarks before the National Summit on Broadband Deployment, Washington, D.C. (Oct. 25, 2001) ("The market is the best vehicle designed by mankind for innovation, for technology change and evolution."); *id.* ("Clearly, legal restraints can retard deployment of new services."); Michael Powell, Chairman, FCC, remarks before the Federal Communications Bar Association, Washington, D.C. (June 21, 2001) ("[B]efore 1993, many argued that we should not open up the wireless market. It was thought that two competitors in the cellular market were certainly more than sufficient. Since that market was opened and PCS introduced we have seen a phenomenal explosion in innovative, digital wireless services.").

APPENDICES

APPENDIX A. ESTIMATING CLEC LINES

APPENDIX B. CLEC CIRCUIT SWITCHES

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APPENDIX D. RATE EXCHANGE AREAS IN THE TOP 100 MSAS WHERE CLECS HAVE OBTAINED NXX CODES

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APPENDIX A. ESTIMATING CLEC LINES

The FCC's February 2002 *Local Telephone Competition Report* includes CLEC line-count figures that are based on counts supplied by the CLECs themselves to the FCC. Those counts do not appear to be accurate, however. There are other significant problems too, but the most important source of inaccuracy is probably that CLECs are either overlooking or misinterpreting the requirement that they convert high-capacity lines into voice-grade-equivalent lines. In contrast, the CLECs *do* make a clear distinction between lines and "voice-grade equivalents" when they report on the state of their business to investors.

According to the Commission's recent report, CLECs reported serving a total of 17.3 million lines as of June 30, 2001. The CLECs inform the FCC that they served about half of those lines – 8.6 million lines – in whole or in part over their own facilities, beginning with their own switches.[1] The other half were resale or UNE-P lines, switched by the ILEC.

The Bell companies are, of course, in a position to check the UNE-P and resale-line totals directly, and Bell company records confirm that the CLECs' resale and UNE-P counts are reasonably accurate. But additional Bell company records indicate beyond serious doubt that the estimates of facilities-based lines that the CLECs are supplying to the Commission are much too low. CLECs are in fact serving two to three times as many lines over their own facilities than their reports to the Commission indicate. In total, CLECs served no fewer than 25 million lines, and likely closer to 32 million lines as of year-end 2001, not 17 million.

<u>"Lines" versus "Voice-Grade Equivalent Lines."</u> The FCC directs CLECs to report "all local exchange service lines and all lines that are used for exchange access services."[2] Carriers must report all "voice-grade *equivalent* lines," which are defined as "a line or channel that directly connects an end user to a carrier and allows the end user to originate and terminate local telephone calls on the public switched network."[3] The FCC further directs carriers to:

> Count as one voice-grade equivalent line: traditional analog POTS lines, Centrex-CO extensions, and Centrex-CU trunks. Count lines based on how they are charged to the customer rather than how they are physically provisioned . . . Report 8 voice-grade equivalent lines if a customer buys 8 trunks that happen to be provisioned over a DS1 circuit. If a customer buys a DS1 circuit that is

[1] CLECs reported serving 5.8 million lines over "CLEC-owned 'last-mile' facilities." *FCC Local Competition Report, Feb. 2002 ed.* at Table 3. In addition, CLECs reported serving 7.6 million lines through "UNEs," which includes UNE loops leased from an ILEC and used in combination with a CLEC's own switch. *See id.* at 1-2 & nn. 3-4. According to data reported by ILECs, there were 4.8 million "UNEs with switching" provided to CLECs. *See id.* at Table 4. Subtracting this figure from the 7.6 million lines that CLECs serve through UNES, results in 2.8 million CLEC lines served using ILEC loops but CLEC switching.

[2] FCC, *Instructions for the Local Competition and Broadband Reporting Form*, FCC Form 477 at 5 (of data as of Dec. 31, 2001) ("*Form 477 Instructions*").

[3] *Id.* at 5, 6 (emphasis in original).

provided as a channelized service, report 24 voice-grade lines, even if there is some indication that the customer is only using 8 of the derived lines.[4]

CLECs certainly know what the term "voice-grade equivalent line" means. They use the term themselves in reports to the investment community, including their reports filed with the Securities Exchange Commission. *See* Section I, Table 4. In dealing with the FCC, however, some CLECs express concern that complying with the FCC's instructions would lead to the release of competitively sensitive information.[5] As the Commission itself has noted, "the reports of at least some CLECs are not consistent" with its directions, and, as a result, "there may be some need for further clarification and adjustment of the reporting system."[6]

E911 Listings: At Least 16 Million Facilities-Based CLEC Lines. As of year-end 2001, CLECs had listed 16 million lines in E911 databases – or almost twice as many as the 8.6 million facilities-based lines they reported to the FCC. This gross discrepancy cannot be attributed to any factor other than gross under-reporting by the CLECs to the FCC.[7]

For obvious reasons, the E911 databases are maintained with scrupulous care. The databases are maintained on behalf of police and fire departments by the ILECs; their contents are derived from both ILEC and CLEC records. ILECs provide all entries for lines served by the ILECs themselves, and for UNE-P and resale lines served by CLECs. CLECs provide the entries for lines switched by CLEC switches. Once a carrier loses a customer, its E911 listing for that customer is replaced by the listing of the customer's new carrier, which ensures that the database does not become infected with large numbers of obsolete listings.

Each E911 subscriber listing represents at least one customer access line, but may represent more than a single line. In the case of business customers, for example, a single E911 listing may represent many individual lines, because a carrier does not typically have to create a separate E911 listings for every line served at the same location. A business might, for example, have 100 lines numbered 326-79xx; a single E911 listing would then suffice to link all calls from 326-79xx numbers as originating from the same location. A count of CLEC lines based of E911 listings will therefore understate the number of lines served by CLEC switches.

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[4] *Id.*

[5] *See*, *e.g.*, Comments of AT&T Corp. at 17, *Local Competition and Broadband Reporting*, CC Docket No. 99-301 (FCC filed Dec. 3, 1999) ("There is little information that is guarded more closely by a newly-developing competitor . . . than its subscriber and access line counts."); Comments of Time Warner Telecom at 6-7, *Local Competition and Broadband Reporting*, CC Docket No. 99-301 (FCC filed Mar. 19, 2001) ("Much of the data the Commission requests on Form 477 is widely considered proprietary and competitively-sensitive. . . . [f]or example, TWTC routinely seeks confidential treatment of its data on total voice telephone service lines and channels provided to end users.").

[6] *FCC Local Competition Report, Feb. 2002 ed.* at 1-2, n.3.

[7] The CLEC-reported totals in the FCC's report are understated for other reasons as well. The FCC requires CLECs to provide the number of lines they serve on a state-by-state basis, but only for the states "in which they provide 10,000 or more 'voice-grade equivalent lines.'" Form 477 Instructions at 1. As the Commission has recognized, "lines as reported by CLECs are understated as a result of th[is] state-specific reporting threshold." *FCC Local Competition Report, Feb. 2002 ed.* at 2, n.5. Any confusion with regard to lines versus "voice-grade-equivalent circuits" may of course seriously compound this under-reporting problem. Moreover, the FCC totals are as of June 2001, whereas the totals reported here are for year-end 2001.

Both the FCC and the Department of Justice have repeatedly relied on E911 listings to estimate CLEC facilities-based lines in section 271 proceedings.[8] No CLEC providing service to end-user customers has yet claimed that its facilities-based lines are actually lower than the totals produced by its E911 listings.[9] Nor has any CLEC disputed that the E911 methodology undercounts lines served.

Interconnection Trunks: 23 Million Facilities-Based CLEC Lines. CLECs have obtained approximately 9 million interconnection *trunks* from ILECs. In the reports they file with the FCC, however, the CLECs claim to be serving only 8.6 million *lines* over their own facilities. It is simply inconceivable that CLECs have obtained roughly one trunk for every line they serve.

CLECs serve a large number of residential and business customers for whom line-to-trunk ratios of between 4:1 and 10:1 are the industry norm. In arriving at the high-end estimate – 23 million facilities-based CLEC lines – presented in this report, the Bell companies used a ratio of 2.75 lines per interconnection trunk. That ratio is based on internal studies that one Bell company (SBC) performed in 1998. That study took a weighted average of the different kinds of customers that CLECs were likely to be serving at that time, and the line-to-trunk ratios they were likely to be using for those different types of customers. The study assumed that 65 percent of CLEC lines were provided to ISPs using a 1:1 line-to-trunk ratio, and that the remaining 35 percent were provided to business customers using a 6:1 line-to-trunk ratio.

Today, CLECs are serving a far higher percentage of non-ISP customers.[10] Their average line-to-trunk ratios will therefore be considerably higher today than they were in 1998. Larger CLECs will have higher line-to-trunk ratios too, because large-number statistics make possible much more efficient sharing of trunks. And CLECs are much less likely to maintain inventories of inactive trunks today than they were in 1998. CLEC operations have grown much more efficient over time, and CLECs are now less likely to base day-to-day business decisions on over-optimistic projections of future growth.

For all of these reasons, our trunk-derived estimates of 23-million facilities-based CLEC lines are very conservative. As with the E911-derived estimates, the actual totals may well be two to ten times higher.

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[8] *See*, *e.g.*, *DOJ Arkansas/Missouri Evaluation* at 4, n. 8 ("Estimated market share will vary depending on the methodology used to estimate facilities-based lines. The Department relied on entries in the E-911 database."); *DOJ New York Evaluation* at 9; *DOJ Kansas/Oklahoma Evaluation* at 4, n. 11 & 7, n. 25; *DOJ Massachusetts Evaluation* at 4; *DOJ Pennsylvania Evaluation* at 4.

[9] On a few occasions (*e.g.*, Sprint in the first Georgia/Louisiana 271 proceeding and WorldCom in the Arkansas/Missouri 271 proceeding), CLECs have claimed that their residential E911 listings were only for test lines, not actual customers, and that they were no longer operating those test lines. While E911 listings are typically removed from the database when a customer modifies or terminates service on a given telephone number (*e.g.*, when the customer switches to another carrier, or the customer's phone number is transferred to a different address), at any given time a snapshot of the E911 database is taken there may still a few inactive E911 listings in the database. Such listings represent no more than a *de minimis* fraction of all CLEC listings in the database at any given time.

[10] For example, based on E911 listings, CLECs serve approximately 3 million residential subscribers today over their own local switches, which represents between 13 and 19 percent of all lines that CLECs serve with their own switches.

CLEC Reports to Investors: 156 Million Voice-Grade Equivalent Lines. Twelve CLECs publicly report the numbers of "voice-grade" "DS0" or "access line" "equivalents" they serve. Together they report serving a total of *156 million* voice-grade circuits. *See* Section I, Table 4. In a recent presentation to Lehman Brothers, AT&T President David Dorman stated that AT&T's local network alone was being used to serve "2.7 M local voice lines," but "over 30 M DSO equivalents."[11] WorldCom's most recent 10-K filed with the SEC indicates that it added more than 10 million "domestic local voice grade equivalents" in 2001 alone, bringing its total to more than 76 million.[12]

[11] Dave Dorman, President, AT&T, *Presentation Before the Lehman Brothers T3 Telecom, Trends and Technology Conference* (Dec. 6, 2001).

[12] WorldCom, Inc., Form 10-K (SEC filed Mar. 13, 2002).

APPENDIX B. CLEC CIRCUIT SWITCHES

This appendix tabulates the circuit switches that CLECs operate. It is based on information contained in Telcordia's *Local Exchange Routing Guide*.

This appendix includes the switches owned by CLECs that have declared bankruptcy. Most such CLECs are still operational (and some are now emerging from bankruptcy). Moreover, switches are a sunk investment, so if one company ceases to use its switch it is highly likely that another company will quickly seize the opportunity to do so (and will probably be able to obtain the switch at a fire-sale price). In addition, even though some CLECs may now be experiencing financial troubles, the fact that they were able to deploy so many switches at one time is still highly probative of the ability of CLECs to deploy switches generally. In any event, switches operated by CLECs that have declared bankruptcy (as of March 31, 2002) represent no more than 17 percent of the total counted here.

CLEC Circuit Switches Serving BOC Rate Centers

State	BOC Region	Type	CLEC	City	Street
AL	BELLSOUTH	DMH	ALLTEL	MONTGOMERY	6925 HALCYON DR
AL	VERIZON	DMH	AT&T	BIRMINGHAM	2101 6TH AVE N
AL	BELLSOUTH	4E	AT&T	BIRMINGHAM	1715 6TH AVE N
AL	BELLSOUTH	4E	AT&T	MONTGOMERY	38 WASHINGTON AVE
AL	BELLSOUTH	5E	E.SPIRE	BIRMINGHAM	505 20TH ST
AL	BELLSOUTH	5E	E.SPIRE	MOBILE	103 DAUPHIN ST
AL	BELLSOUTH	5E	E.SPIRE	MONTGOMERY	ONE COURT SQUARE
AL	BELLSOUTH	5E	ICG COMMUNICATIONS	BIRMINGHAM	2114 1ST AVE N
AL	BELLSOUTH	NT5	INTERMEDIA COMMUNICATIONS	BIRMINGHAM	2705 6TH AVE S
AL	BELLSOUTH	DM5	ITC^DELTACOM	ANNISTON	2 DELTA DR
AL	VERIZON	DM5	ITC^DELTACOM	BIRMINGHAM	900 APPALACHEE ST
AL	VERIZON	DS	ITC^DELTACOM	HUNTSVILLE	8600 S MEMORIAL PKY
AL	BELLSOUTH	DS	ITC^DELTACOM	MOBILE	25 BATTLESHIP PKY
AL	BELLSOUTH	DS	ITC^DELTACOM	MONTGOMERY	10 TALLAPOOSA ST
AL	BELLSOUTH	5E	KMC TELECOM	HUNTSVILLE	994 EXPLORER BLVD
AL	BELLSOUTH	5E	KMC TELECOM	MONTGOMERY	315 N BAINBRIDGE ST
AL	BELLSOUTH	DS	LEVEL 3	BIRMINGHAM	600 18TH ST N
AL	BELLSOUTH	DS	NETWORK TELEPH.	BIRMINGHAM	1920 OXMOOR RD
AL	BELLSOUTH	5E	NEWSOUTH COMMUNICATIONS	BIRMINGHAM	950 22ND ST SUITE 850
AL	BELLSOUTH	EWSD	NEWSOUTH COMMUNICATIONS	MOBILE	103 DAUPHIN ST
AL	BELLSOUTH	DS	US LEC	BIRMINGHAM	600 UNIVERSITY PARK PL
AL	BELLSOUTH	5E	US LEC	MOBILE	3100 COTTAGE HILL RD @ BLDG-5
AL	BELLSOUTH	DMT	WEBSHOPPE COMMUNICATIONS	ALEXANDER CITY	246 CHURCH ST
AR	SBC	5E	ADELPHIA	LITTLE ROCK	W 3RD ST & S GAINES ST
AR	SBC	DS	ALLTEL	FAYETTEVILLE	138 N EAST AVE
AR	SBC	DS	ALLTEL	FORT SMITH	101 N 13TH ST
AR	SBC	DMH	ALLTEL	LITTLE ROCK	4001 N RODNEY PARHAM
AR	SBC	4E	AT&T	LITTLE ROCK	715 S LOUISIANA ST
AR	SBC	5E	E.SPIRE	LITTLE ROCK	124 W CAPITAL AVE
AR	SBC	DMH	TRIVERGENT	LITTLE ROCK	1519 S BOWMAN RD
AR	SBC	5E	WORLDCOM	LITTLE ROCK	323 S CROSS ST
AZ	QWEST	5ES	ADELPHIA	PHOENIX	1402 E BUCKEYE RD
AZ	QWEST	5E	ALLEGIANCE TELECOM	PHOENIX	120 E VAN BUREN ST
AZ	QWEST	4E	AT&T	MESA	1231 W UNIVERSITY DR

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
AZ	QWEST	4E	AT&T	PHOENIX	211 W MONROE ST
AZ	QWEST	5ES	AT&T	PHOENIX	211 W MONROE ST
AZ	QWEST	5ES	AT&T	PHOENIX	2730 E CAMELBACK RD
AZ	QWEST	4E	AT&T	TUCSON	126 E ALAMEDA ST
AZ	QWEST	DM5	COX	CHANDLER	100 N 79TH ST
AZ	QWEST	DM5	COX	PHOENIX	6610 W VAN BUREN ST
AZ	QWEST	5ES	E.SPIRE	TUCSON	33 N NORTH STONE AVE
AZ	QWEST	DMS1/200	ELECTRIC LIGHTWAVE	PHOENIX	313 N 3RD AVE
AZ	QWEST	DMS100	ESCHELON	PHOENIX	2600 N CENTRAL AVE
AZ	QWEST	NT5	GLOBAL CROSSING	PHOENIX	429 S 6TH DR
AZ	QWEST	DS	GREAT WEST SVCS	CHANDLER	700 N CORONADO ST
AZ	QWEST	NT5	INTERMEDIA COMMUNICATIONS	PHOENIX	3115 N 3RD AVE
AZ	QWEST	DS	LEVEL 3	PHOENIX	811 S 16TH ST
AZ	QWEST	DS	LEVEL 3	TUCSON	210 W ELM ST
AZ	QWEST	DS	MCLEODUSA	PHOENIX	1710 E GRANT ST
AZ	QWEST	DS	MOUNTAIN TELECOM	SCOTTSDALE	10190 E MCKELLIPS RD
AZ	QWEST	DMS100	NORTH COUNTY COMMUNICATIONS	PHOENIX	1609 N 12TH ST
AZ	QWEST	DMS100	NORTH COUNTY COMMUNICATIONS	PHOENIX	1220 E WASHINGTON ST
AZ	QWEST	DMS100	NORTH COUNTY COMMUNICATIONS	TUCSON	177 N CHURCH AVE
AZ	QWEST	NT5	SADDLEBACK COMMUNICATIONS COMPANY	SCOTTSDALE	10190 E MCKELLIPS RD
AZ	QWEST	NT5	TELIGENT	TEMPE	7850 S HARDY DR
AZ	QWEST	DM5	TIME WARNER TELECOM	PHOENIX	3220 N 3RD ST
AZ	QWEST	DM5	TIME WARNER TELECOM	TUCSON	3836 S EVANS BLVD
AZ	QWEST	NT5	WORLDCOM	PHOENIX	111 W MONROE ST
AZ	QWEST	5ES	WORLDCOM	TUCSON	75 E ALAMEDA ST
AZ	QWEST	NT5	XO	PHOENIX	3930 E WATKINS ST
CA	SBC	DS	ADVANCED TELCOM GROUP	CONCORD	2041 EAST ST
CA	SBC	5E	ADVANCED TELCOM GROUP	SAN RAFAEL	1009 E ST
CA	VERIZON	5E	ALLEGIANCE TELECOM	LOS ANGELES	818 W 7TH ST. SUITE 320
CA	SBC	5E	ALLEGIANCE TELECOM	RANCHO CORDOVA	10995 GOLD CENTER DR
CA	SBC	5E	ALLEGIANCE TELECOM	SAN DIEGO	5761 COPLEY DR
CA	SBC	5E	ALLEGIANCE TELECOM	SAN FRANCISCO	651 BRANNAN STREET, 3RD FLOOR
CA	VERIZON	5E	ALLEGIANCE TELECOM	SANTA ANA	1251 E DYER RD
CA	SBC	5E2	ALLEGIANCE TELECOM	SUNNYVALE	677 PALOMAR AVE
CA	SBC	DS	ARRIVAL COMMUNICATIONS	BAKERSFIELD	1800 19TH ST
CA	VERIZON	5E	AT&T	ANAHEIM	217 N LEMON ST
CA	SBC	4E	AT&T	ANAHEIM	217 N LEMON ST
CA	SBC	4E	AT&T	DUNNIGAN	INTER YOLO CNTY
CA	SBC	5E	AT&T	DUNNIGAN	INTER YOLO COUNTY & ROADS 6 AND 86
CA	SBC	4E	AT&T	GARDENA	17200 S VERMONT AVE
CA	VERIZON	5E	AT&T	LOS ANGELES	700 S FLOWER ST
CA	SBC	4E	AT&T	LOS ANGELES	420 S GRAND AVE
CA	SBC	NT5	AT&T	LOS ANGELES	420 S GRAND AVE
CA	SBC	5E	AT&T	MOJAVE	N-O HWY 58 & 9 MI E-O MOJAVE INDEX D
CA	SBC	4E	AT&T	OAKLAND	1601 FRANKLIN ST

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
CA	SBC	NT5	AT&T	OAKLAND	1601 FRANKLIN ST
CA	SBC	5E	AT&T	OAKLAND	344 20TH ST
CA	SBC	5E	AT&T	OAKLAND	1587 FRANKLIN ST
CA	VERIZON	4E	AT&T	OXNARD	1050 S C ST
CA	VERIZON	5E	AT&T	SACRAMENTO	603 S ST
CA	SBC	4E	AT&T	SACRAMENTO	1407-11-23 J ST
CA	VERIZON	4E	AT&T	SAN BERNARDINO	455 2ND ST
CA	SBC	5E	AT&T	SAN BERNARDINO	455 W 2ND ST
CA	SBC	5E	AT&T	SAN DIEGO	5464 MOREHOUSE DR
CA	SBC	NT5	AT&T	SAN DIEGO	650 ROBINSON AVE
CA	SBC	4E	AT&T	SAN DIEGO	650 ROBINSON AVE
CA	VERIZON	5E	AT&T	SAN FRANCISCO	1 BUSH ST
CA	VERIZON	NT5	AT&T	SAN FRANCISCO	360 SPEAR ST
CA	SBC	5E	AT&T	SAN FRANCISCO	555 PINE ST
CA	SBC	4E	AT&T	SAN FRANCISCO	611 FOLSOM ST
CA	SBC	5E	AT&T	SAN FRANCISCO	360 SPEAR ST
CA	VERIZON	NT5	AT&T	SAN JOSE	95 ALMADEN AVE
CA	SBC	4E	AT&T	SAN JOSE	95 ALMADEN AV
CA	SBC	5E	AT&T	SAN JOSE	95 ALMADEN AV
CA	VERIZON	5E	AT&T	SHERMAN OAKS	14800 VENTURA BLVD
CA	SBC	4E	AT&T	SHERMAN OAKS	14800 VENTURA BLVD
CA	SBC	5E	AT&T	SHERMAN OAKS	14800 VENTURA BLVD
CA	SBC	4E	AT&T	STOCKTON	344 N HUNTER ST
CA	SBC	5E	AT&T	STOCKTON	345 N SAN JOAQUIN AV
CA	SBC	D12	CITIZENS	ELK GROVE	820 ELK GROVE FLORIN RD
CA	VERIZON	5E	COX	ALISO VEIJO	17 JOURNEY ST
CA	SBC	D12	COX	EL CAJON	1175 N. CUYAMUCA ST.
CA	SBC	DMS	COX	RANCHO SANTA MARGARITA	29947 AVENIDA DE LAS BANDERAS
CA	SBC	D12	COX	SAN DIEGO	1441 EUCLID AVE
CA	SBC	D12	ELECTRIC LIGHTWAVE	RANCHO CORDOVA	3224 LUYUNG DR.
CA	VERIZON	NT5	FIRST WORLD COMMUNICATIONS	ANAHEIM	1520 S LEWIS ST
CA	VERIZON	NT5	FOCAL COMMUNICATIONS	LOS ANGELES	1200 W 7TH ST
CA	VERIZON	DM5	FOCAL COMMUNICATIONS	SAN FRANCISCO	650 TOWNSEND ST
CA	SBC	NT5	FOCAL COMMUNICATIONS	SAN JOSE	1741 TECHNOLOGY DR
CA	VERIZON	DS	GLOBAL CROSSING	ANAHEIM	2461 W LA PALMA AVE 2ND FLR
CA	SBC	NT5	GLOBAL CROSSING	CALIFORNIA	SAN DIEGO
CA	SBC	NT5	GLOBAL CROSSING	SACRAMENTO	1303 J ST
CA	VERIZON	5E	ICG COMMUNICATIONS	ALHAMBRA	2300 W VALLEY BLVD
CA	SBC	5E	ICG COMMUNICATIONS	IRVINE	2968 WHITE RD., SUITE 200
CA	VERIZON	5E	ICG COMMUNICATIONS	LAKEWOOD	4007 PARAMOUNT BLVD
CA	VERIZON	5E	ICG COMMUNICATIONS	LOS ANGELES	1905 ARMACOST AVE
CA	SBC	5E2	ICG COMMUNICATIONS	LOS ANGELES	600 W 7TH ST
CA	SBC	5E2	ICG COMMUNICATIONS	MILPITAS	1175 MONTAGUE EXPRESSWAY
CA	SBC	5E	ICG COMMUNICATIONS	OAKLAND	180 GRAND AVE
CA	VERIZON	5E	ICG COMMUNICATIONS	ONTARIO	1471 VALENCIA PL
CA	SBC	5E	ICG COMMUNICATIONS	SACRAMENTO	1414 K ST
CA	SBC	5E	ICG COMMUNICATIONS	SACRAMENTO	770 L ST
CA	SBC	5E	ICG COMMUNICATIONS	SAN DIEGO	8951 COMPLEX DR
CA	SBC	5E	ICG COMMUNICATIONS	SAN FRANCISCO	620 3RD ST

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
CA	VERIZON	5E	ICG COMMUNICATIONS	SAN JOSE	190 PARK CENTER PLAZA
CA	SBC	5E	KCINDUR COMM	SAN LUIS OBISPO	872 MORRO ST
CA	SBC	DS	LEVEL 3	FRESNO	305 W NAPA AVE
CA	SBC	DS	LEVEL 3	WEST SACRAMENTO	1075 TRIANGLE CT
CA	VERIZON	DMS	MPOWER	BELLFLOWER	16730 BELLFLOWER BLVD
CA	SBC	DS	MPOWER	EMERYVILLE	1400 65TH ST
CA	SBC	NT5	MPOWER	LA MESA	4695 PALM AVE
CA	VERIZON	DMS	MPOWER	POMONA	362 E 4TH ST
CA	SBC	DS	MPOWER	SACRAMENTO	9332 TECH CENTER DR
CA	SBC	NT5	MPOWER	SAN JOSE	560 CHARCOT AVE
CA	VERIZON	DM5	NET-TEL CORP.	LOS ANGELES	530 W 6TH ST
CA	SBC	NT5	NET-TEL CORP.	SAN FRANCISCO	200 PAUL AVE
CA	VERIZON	DMH	NORTH COUNTY COMMUNICATIONS	LOS ANGELES	624 SOUTH GRAND
CA	SBC	DMH	NORTH COUNTY COMMUNICATIONS	SACRAMENTO	926 J ST
CA	SBC	DMH	NORTH COUNTY COMMUNICATIONS	SAN DIEGO	4008 TAYLOR ST
CA	VERIZON	DMH	NORTH COUNTY COMMUNICATIONS	SAN FRANCISCO	98 BATTERY ST
CA	VERIZON	VCD	PAETEC	LOS ANGELES	530 W 6TH ST
CA	VERIZON	NT5	POINTE COMM INC	EL MONTE	11025 VALLEY BLVD
CA	SBC	NT5	POINTE COMM INC	SAN DIEGO	3949 RUFFIN RD
CA	SBC	5E	RCN	CARSON	1059 E BEDMAR ST
CA	SBC	5E	RCN	SAN FRANCISCO	200 PAUL AVE
CA	SBC	D12	SIERRA TELEPHONE CO.	OAKHURST	41950 ROAD 426
CA	SBC	5E	SUREWEST COMMUNICATIONS	ROSEVILLE	224 LINCOLN ST
CA	VERIZON	NT5	TELIGENT	LOS ANGELES	1200 W 7TH ST
CA	SBC	NT5	TELIGENT	OAKLAND	1111 BROADWAY
CA	SBC	DS	TIME WARNER TELECOM	BAKERSFIELD	1918 M ST
CA	SBC	DM5	TIME WARNER TELECOM	FRESNO	7576 N DEL MAR AVE
CA	SBC	5ESS	TIME WARNER TELECOM	IRVINE	7 MASON
CA	VERIZON	DM5	TIME WARNER TELECOM	LOS ANGELES	3700 WILSHIRE BLVD
CA	VERIZON	DM5	TIME WARNER TELECOM	RIVERSIDE	1110 PALMYRITA AVE
CA	SBC	5E	TIME WARNER TELECOM	SAN DIEGO	8925 WARE CT
CA	SBC	DMS	TIME WARNER TELECOM	SAN DIEGO	1125 NINTH ST
CA	VERIZON	DM5	TIME WARNER TELECOM	SAN FRANCISCO	501 2ND ST
CA	VERIZON	DM5	TIME WARNER TELECOM	SAN LUIS OBISPO	3050 BROAD ST
CA	VERIZON	DMS	TIME WARNER TELECOM	WALNUT CREEK	1340 TREAT BLVD
CA	VERIZON	5E	U.S. TELEPACIFIC	LOS ANGELES	800 W 6TH ST SUITE 300 3RD FLOOR
CA	SBC	5E	U.S. TELEPACIFIC	SAN DIEGO	6134 NANCY RIDGE DR
CA	SBC	5E	U.S. TELEPACIFIC	SAN JOSE	55 NICHOLSON LN
CA	SBC	DM5	URJET BACKBONE NETWORK	LOS ANGELES	624 S GRAND AVE 11TH FLOOR
CA	SBC	5E	WESTERN INTEGRATED NETWORKS	NORTH HIGHLANDS	5411 LUCE AVE
CA	VERIZON	DE4	WORLDCOM	ANAHEIM	905 EAST DISCOVERY LANE
CA	SBC	5E	WORLDCOM	BAKERSFIELD	1415 18TH ST
CA	SBC	5E	WORLDCOM	BAKERSFIELD	1415 18TH ST
CA	SBC	5E	WORLDCOM	FRESNO	1315 VAN NESS AVE
CA	SBC	5E	WORLDCOM	FRESNO	1315 VAN NESS

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
CA	SBC	DMH	WORLDCOM	HAYWARD	21350 CABOT BLVD
CA	VERIZON	NT5	WORLDCOM	IRVINE	17642 ARMSTRONG AVE
CA	VERIZON	DE4	WORLDCOM	LOS ANGELES	609 W 7TH AVE
CA	SBC	AXT	WORLDCOM	LOS ANGELES	1149 S BROADWAY ST
CA	SBC	AXT	WORLDCOM	LOS ANGELES	1149 SOUTH BROADWAY
CA	SBC	5E	WORLDCOM	REDWOOD CITY	2700 SPRING ST
CA	SBC	DE4	WORLDCOM	SAN DIEGO	707 BROADWAY
CA	SBC	NT5	WORLDCOM	SAN DIEGO	8806 COMPLEX DR
CA	SBC	DMH	WORLDCOM	SAN DIEGO	8806 COMPLEX DR
CA	VERIZON	DE4	WORLDCOM	SAN FRANCISCO	274 BRANNAN ST
CA	SBC	AXT	WORLDCOM	SAN FRANCISCO	525 MARKET ST
CA	SBC	AXT	WORLDCOM	SAN FRANCISCO	525 MARKET ST
CA	SBC	NT5	WORLDCOM	SAN JOSE	611 RIVER OAKS PKY
CA	SBC	5E	WORLDCOM	STOCKTON	400 E MAIN ST
CA	SBC	5E	WORLDCOM	SUNNYVALE	464 OAKMEAD PKY
CA	SBC	5E	WORLDCOM	WEST SACRAMENTO	2820 KOVR DR
CA	SBC	NT5	XO	FREMONT	855 MISSION CT
CA	VERIZON	DMS	XO	LONG BEACH	200 PINE AVE
CA	SBC	DS	XO	LONG BEACH	200 PINE AVE
CA	SBC	DMS	XO	LOS ANGELES	624 S GRAND
CA	SBC	DMS	XO	LOS ANGELES	624 S GRAND
CA	SBC	DM5	XO	ROSEVILLE	1390 LEAD HILL BLVD
CA	SBC	DMS	XO	SAN DIEGO	5771 COPLEY DR
CA	VERIZON	NT5	XO	SANTA ANA	1924 E DEERE AVE
CA	SBC	DMS	XO	SANTA ANA	1924 E DEERE AVE
CA	SBC	DMS	XO	SANTA ANA	1924 E DEERE AVE
CT	SBC	DS	ADVANCED TELCOM GROUP	STAMFORD	76 PROGRESS DR
CT	SBC	5E	AT&T	BRIDGEPORT	522 FAIRFIELD AVE
CT	SBC	NT5	AT&T	CHESHIRE	751 HIGGINS RD
CT	SBC	DMS	AT&T	HARTFORD	153 MARKET ST
CT	SBC	4E	AT&T	NEW HAVEN	310 ORANGE ST
CT	SBC	NT5	AT&T	STAMFORD	76 PROGRESS DR
CT	SBC	5E	CABLEVISION LIGHTPATH	NORWALK	28 CROSS ST
CT	SBC	DS	CHOICE ONE	HARTFORD	NORTHEAST PLZ TOWER 2
CT	SBC	5E	CONVERSENT	NEW HAVEN	300 GEORGE ST
CT	SBC	D12	COX	MANCHESTER	170 UTOPIA RD
CT	SBC	NT5	GLOBAL CROSSING	STAMFORD	114 STILLWATER
CT	SBC	D12	WORLDCOM	HARTFORD	242 TRUMBULL ST
CT	SBC	5E	WORLDCOM	HARTFORD	MAIN ST & GOLD ST
CT	SBC	AXT	WORLDCOM	HARTFORD	185 ASYLUM ST
CT	SBC	AXT	WORLDCOM	HARTFORD	185 ASYLUM ST @ SEE ALSO CITY PLACE
CT	SBC	5E	WORLDCOM	STAMFORD	1351 WASHINGTON BLVD
CT	SBC	AXT	WORLDCOM	STAMFORD	3 LANDMARK SQ
DC	VERIZON	5E	ALLEGIANCE TELECOM	WASHINGTON	1120 VERMONT AVE NW
DC	VERIZON	5E	ARBROS	WASHINGTON	1201 L ST NW
DC	VERIZON	5E	AT&T	WASHINGTON	725 13TH ST.
DC	VERIZON	4E	AT&T	WASHINGTON	30 E ST SW
DC	VERIZON	DMH	AT&T	WASHINGTON	1331 F ST NW
DC	VERIZON	NT5	FOCAL COMMUNICATIONS	WASHINGTON	1120 VERMONT AVE NW

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
DC	VERIZON	NT5	GLOBAL CROSSING	WASHINGTON	1220 L ST N.W.
DC	VERIZON	DM5	NET2000	WASHINGTON	1275 K ST
DC	VERIZON	NT5	TELIGENT	WASHINGTON	1120 VERMONT AVE NW
DC	VERIZON	NT5	WORLDCOM	WASHINGTON	120 INGRAHAM ST NE
DC	VERIZON	5E	WINSTAR	WASHINGTON	1850 M ST NW
DC	VERIZON	VCD	WINSTAR	WASHINGTON	1850 M ST NW
DC	VERIZON	DMS	XO	WASHINGTON	4301 CONNECTICUT AVE NW
DE	VERIZON	DMH	CAVALIER TELEPHONE	NEWARK	500 N WAKEFIELD DR
FL	BELLSOUTH	5E	ADELPHIA	JACKSONVILLE	6263 PHILLIPS HWY
FL	BELLSOUTH	5E	ADELPHIA	TAMARAC	2121 W PROSPECT RD
FL	VERIZON	5E	ALLEGIANCE TELECOM	TAMPA	8230 E BROADWAY AVE
FL	BELLSOUTH	5E	ALLTEL	JACKSONVILLE	601 RIVERSIDE AVE
FL	BELLSOUTH	4E	AT&T	FORT LAUDERDALE	1352 NW 40TH AVE
FL	BELLSOUTH	5E	AT&T	FORT LAUDERDALE	1340 NW N.W. 40TH AVE
FL	VERIZON	5E	AT&T	JACKSONVILLE	424 PEARL ST
FL	BELLSOUTH	4E	AT&T	JACKSONVILLE	424 PEARL ST
FL	BELLSOUTH	5E	AT&T	JACKSONVILLE	424 N PEARL ST
FL	BELLSOUTH	NT5	AT&T	JACKSONVILLE	424 N PEARL ST
FL	BELLSOUTH	5E	AT&T	JACKSONVILLE	5934 RICHARD RD
FL	BELLSOUTH	4E	AT&T	OJUS	460 NE 215 ST
FL	BELLSOUTH	NT5	AT&T	OJUS	460 NE 215TH ST
FL	BELLSOUTH	4E	AT&T	ORLANDO	45 N MAGNOLIA AVE
FL	BELLSOUTH	5E	AT&T	ORLANDO	45 N MAGNOLIA AVE
FL	BELLSOUTH	5E	AT&T	ORLANDO	1151 N KELLER RD
FL	BELLSOUTH	5E	AT&T	POMPANO BEACH	141 NW 16TH ST
FL	VERIZON	4E	AT&T	TAMPA	2261 MASSARO BLVD
FL	VERIZON	5E	AT&T	TAMPA	6015 BENJAMIN RD
FL	BELLSOUTH	4E	AT&T	WEST PALM BEACH	325 GARDENIA ST
FL	BELLSOUTH	5E	AT&T	WEST PALM BEACH	3700 RCA BLVDAVE
FL	BELLSOUTH	VCD	BTI	JACKSONVILLE	121 W FORSYTH ST SUITE 100
FL	BELLSOUTH	5E	BTI	ORLANDO	201 S ORANGE AVE
FL	BELLSOUTH	5E	BTI	ORLANDO	201 S ORANGE AVE
FL	VERIZON	VCD	BTI	TAMPA	400 N TAMPA ST
FL	BELLSOUTH	5E	E.SPIRE	FORT LAUDERDALE	100 NE 3RD AVE
FL	BELLSOUTH	5E	E.SPIRE	JACKSONVILLE	200 W FORSYTH ST
FL	VERIZON	5EH	E.SPIRE	TAMPA	111 MADISON ST
FL	BELLSOUTH	5E	EAGLE COMMUNICATIONS	MIAMI	1 NE 1ST ST
FL	BELLSOUTH	NT5	FLORIDA DIGITAL NETWORK	FORT LAUDERDALE	200 N ANDREWS AVE
FL	BELLSOUTH	NT5	FLORIDA DIGITAL NETWORK	GAINESVILLE	400 SW 2ND AVE
FL	BELLSOUTH	NT5	FLORIDA DIGITAL NETWORK	JACKSONVILLE	3986 BLVD CENTER DR
FL	BELLSOUTH	NT5	FLORIDA DIGITAL NETWORK	ORLANDO	390 N ORANGE AVE
FL	BELLSOUTH	NT5	FLORIDA DIGITAL NETWORK	PORT ORANGE	829 ORANGE AVE
FL	VERIZON	NT5	FLORIDA DIGITAL NETWORK	TAMPA	610 E ZACK ST
FL	VERIZON	DMH	FLORIDA DIGITAL NETWORK	TAMPA	655 N FRANKLIN ST
FL	BELLSOUTH	NT5	FOCAL COMMUNICATIONS	MIAMI	701 BRICKELL AVE
FL	VERIZON	NT5	GLOBAL CROSSING	TAMPA	400 N TAMPA ST

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
FL	BELLSOUTH	NT5	GLOBAL NAPS	MIAMI	100 S BISCAYNE BLVD
FL	BELLSOUTH	DMS	IDS TELECOM	MIAMI	1080 NW 163RD DR
FL	BELLSOUTH	VCD	INTERLOOP INC	MIAMI	15590 NW 15TH AVE
FL	VERIZON	5E	INTERLOOP INC	TAMPA	3403 ORIENT RD
FL	BELLSOUTH	NT5	INTERMEDIA COMMUNICATIONS	JACKSONVILLE	7020 A C SKINNER PKY
FL	BELLSOUTH	DMS	INTERMEDIA COMMUNICATIONS	MIAMI	1907 NW 87TH ST
FL	BELLSOUTH	NT5	INTERMEDIA COMMUNICATIONS	ORLANDO	100 W LUCERNE CIR
FL	BELLSOUTH	NT5	INTERMEDIA COMMUNICATIONS	ORLANDO	111 N ORANGE AVE
FL	VERIZON	DMT	INTERMEDIA COMMUNICATIONS	TAMPA	3502 QUEEN PALM DR
FL	BELLSOUTH	DS	ITC^DELTACOM	DAYTONA BEACH	268 N RIDGEWOOD AVE
FL	BELLSOUTH	DS	ITC^DELTACOM	JACKSONVILLE	421 W CHURCH ST
FL	BELLSOUTH	DS	ITC^DELTACOM	OCALA	2909 SE 36TH AVE
FL	BELLSOUTH	DS	ITC^DELTACOM	ORLANDO	201 S ORANGE AVENUE
FL	BELLSOUTH	DS	ITC^DELTACOM	PANAMA CITY	1795 INDUSTRIAL DR
FL	BELLSOUTH	DMS	ITC^DELTACOM	PENSACOLA	100 N Q ST
FL	VERIZON	DS	ITC^DELTACOM	TAMPA	655 N FRANKLIN ST
FL	BELLSOUTH	DS	ITC^DELTACOM	WEST PALM BEACH	1475 CENTREPARK BLVD
FL	VERIZON	5E	KMC TELECOM	CLEARWATER	12690 44TH ST N
FL	BELLSOUTH	5E	KMC TELECOM	ENSLEY	7891 SEARS BLVD
FL	BELLSOUTH	5E	KMC TELECOM	HOLLY HILL	1640 STATE AV
FL	BELLSOUTH	5E	KMC TELECOM	PALM BAY	2300 COMMERCE PARK DR NE
FL	VERIZON	5E	KMC TELECOM	SARASOTA	6288 TOWER LN
FL	BELLSOUTH	DS	LEVEL 3	JACKSONVILLE	4814 PHILLIPS HWY
FL	BELLSOUTH	EWSD	METTEL	MIAMI	100 N BISCAYNE BLVD
FL	BELLSOUTH	NT5	MPOWER	FORT LAUDERDALE	201 NE 24TH ST
FL	VERIZON	NT5	MPOWER	TAMPA	655 N FRANKLIN ST
FL	BELLSOUTH	5E	NETWORK PLUS	MIAMI	100 NE 80TH TER
FL	BELLSOUTH	DS	NETWORK TELEPH.	PENSACOLA	30 W BELMONT ST
FL	BELLSOUTH	DCO	NEW MILLENNIUM TELECOMMUNICATIONS INC.	MIAMI	100 N BISCAYNE BLVD
FL	BELLSOUTH	EWSD	NEWSOUTH COMMUNICATIONS	DESTIN	185 STAHLMAN AVE
FL	VERIZON	5E	NEWSOUTH COMMUNICATIONS	WINTER HAVEN	200 AVE B
FL	BELLSOUTH	EWSD	ORLANDO TELEPHONE	ORLANDO	4558 35TH ST
FL	BELLSOUTH	VCD	PAETEC	MIAMI	100 N BISCAYNE BLVD
FL	BELLSOUTH	NT5	POINTE COMM INC	MIAMI	99 S. E. 5TH STREET
FL	BELLSOUTH	5E	SPRINT	ORLANDO	200 E ROBINSON ST
FL	BELLSOUTH	NT5	TELIGENT	EATONVILLE	250 RIO DR
FL	BELLSOUTH	5E	TIME WARNER TELECOM	MAITLAND	2251 LUCIEN WAY
FL	BELLSOUTH	5E	TIME WARNER TELECOM	ORLANDO	7003 PRESIDENTS DR
FL	BELLSOUTH	DMH	TRIVERGENT	MIAMI	18504 NE 5TH AVE
FL	VERIZON	NT5	URBAN MEDIA LONG DISTANCE	TAMPA	7808 WOODLAND CENTER BLVD
FL	BELLSOUTH	5E	US LEC	JACKSONVILLE	6410 SOUTHPOINT PKY
FL	BELLSOUTH	VCD	US LEC	MIAMI	5301 BLUE LAGOON DR
FL	BELLSOUTH	5E	US LEC	PALM BEACH GARDENS	7121 FAIRWAY DR
FL	VERIZON	5E	US LEC	TAMPA	400 N TAMPA ST
FL	BELLSOUTH	5E	WINSTAR	MIAMI	150 SE 2ND AVE
FL	BELLSOUTH	5E	WINSTAR	ORLANDO	201 S ORANGE AVENUE
FL	VERIZON	VCD	WINSTAR	TAMPA	4200 W CYPESS ST
FL	BELLSOUTH	DE4	WORLDCOM	MIAMI	150 SE 2ND AVE

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
FL	BELLSOUTH	5E	WORLDCOM	MIAMI	8830 NW 18TH TER
FL	BELLSOUTH	DE4	WORLDCOM	MIAMI	150 SE 2ND AVE
FL	BELLSOUTH	DE4	WORLDCOM	ORLANDO	250 S. ORANGE AVE
FL	BELLSOUTH	DMH	WORLDCOM	ORLANDO	400 LK DESTINY RD
FL	BELLSOUTH	DE4	WORLDCOM	POMPANO BEACH	599 SW 16TH TER
FL	BELLSOUTH	DE4	WORLDCOM	POMPANO BEACH	599 SW 16TH TER
FL	VERIZON	DE4	WORLDCOM	TAMPA	1000 NORTH ASHLEY DR. 9TH FL
FL	VERIZON	DMH	WORLDCOM	TAMPA	8212 WOODLAND CENTER BLVD
FL	BELLSOUTH	DMS	XO	MIAMI	16565 B NW 15TH ST
FL	VERIZON	DM5	XO	TAMPA	5904A HAMPTON OAKS PKY
GA	BELLSOUTH	5E	ADELPHIA	ATLANTA	953 DONNELLY AVE SW
GA	BELLSOUTH	5E	ALLEGIANCE TELECOM	ATLANTA	55 MARIETTA ST NW
GA	BELLSOUTH	DMS	ALLTEL	AUGUSTA	1490 ELLIS ST
GA	BELLSOUTH	DMH	ALLTEL	RINCON	ONE BLOCK OFF HWY 21
GA	BELLSOUTH	4E	AT&T	ATLANTA	3003 S COBB PKWY
GA	BELLSOUTH	4E	AT&T	ATLANTA	51 PEACHTREE CENTER AVE NE
GA	BELLSOUTH	5E	AT&T	ATLANTA	51 PEACHTREE CENTER AVE NE
GA	BELLSOUTH	NT5	AT&T	ATLANTA	51 PEACHTREE CENTER AVE NE
GA	BELLSOUTH	4E	AT&T	MACON	1030 GEORGIA AVE
GA	BELLSOUTH	5E	AT&T	MACON	1030 GEORGIA AVE
GA	BELLSOUTH	4E	AT&T	MONTICELLO	266 E GREEN ST
GA	BELLSOUTH	DMH	AT&T	NORCROSS	5060 AVALON RIDGE PKY
GA	BELLSOUTH	5E	AT&T	STONE MOUNTAIN	4545 STONEGATE INDUSTRIAL BLVD
GA	BELLSOUTH	5E	BTI	ATLANTA	55 PARK PL NE
GA	BELLSOUTH	DS	COMM SOUTH COS	HAWKINSVILLE	BROAD ST
GA	BELLSOUTH	EWS	DARIEN COMMUNICATIONS	DARIEN	1011 NORTHWAY ST
GA	BELLSOUTH	5E	E.SPIRE	ATLANTA	2 RAVINIA DR NE
GA	BELLSOUTH	5E	E.SPIRE	COLUMBUS	1044 FRONT ST
GA	BELLSOUTH	NT5	FOCAL COMMUNICATIONS	ATLANTA	250 WILLIAMS ST NW
GA	BELLSOUTH	NT5	GLOBAL CROSSING	ATLANTA	250 WILLIAMS ST
GA	BELLSOUTH	5E	ICG COMMUNICATIONS	CHAMBLEE	30 PERIMETER PARK DR
GA	BELLSOUTH	NT5	INTERMEDIA COMMUNICATIONS	ATLANTA	360 INTERSTATE NORTH PKY NW
GA	BELLSOUTH	DS	ITC^DELTACOM	ATHENS	125 REESE ST
GA	BELLSOUTH	DS	ITC^DELTACOM	ATLANTA	55 PARK PL NE
GA	BELLSOUTH	DS	ITC^DELTACOM	AUGUSTA	301 15TH ST
GA	BELLSOUTH	DS	ITC^DELTACOM	MACON	160 STATE ST
GA	BELLSOUTH	DS	ITC^DELTACOM	SAVANNAH	1315 BULL ST
GA	BELLSOUTH	5E	KMC TELECOM	AUGUSTA	419 11TH ST
GA	BELLSOUTH	5E	KMC TELECOM	SAVANNAH	81 ROSS RD
GA	BELLSOUTH	DS	LECSTAR	ALBANY	304 PINE AVE
GA	BELLSOUTH	5E	LECSTAR	AUGUSTA	937 GREENE ST
GA	BELLSOUTH	DS	LECSTAR	MACON	787 CHERRY ST
GA	BELLSOUTH	5E	LECSTAR	SAVANNAH	1300 BULL ST
GA	BELLSOUTH	EWS	LIGHTSOURCE TELECOM	ROSWELL	1940 OLD ALABAMA RD
GA	BELLSOUTH	NT5	MPOWER	ATLANTA	1593 NORTHEAST EXPY NE
GA	BELLSOUTH	NT5	NET-TEL CORP.	ATLANTA	250 WILLIAMS ST NW
GA	BELLSOUTH	5E	NETWORK PLUS	NORCROSS	3190 REPS MILLER RD NW
GA	BELLSOUTH	DS	NETWORK TELEPH.	ATLANTA	2700 NE EXPRESSWAY ACCESS RD NE @ BLDG-B
GA	BELLSOUTH	NT5	TELIGENT	ATLANTA	55 MARIETTA ST

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
GA	BELLSOUTH	DS	TOUCHTONE COMMUNICATIONS	VALDOSTA	501 NORTH TOOMBS
GA	BELLSOUTH	DS	TRIVERGENT	ATLANTA	3423 PIEDMONT RD NE
GA	BELLSOUTH	5E	US LEC	ATLANTA	2 CONCOURSE PKY NE
GA	BELLSOUTH	5E	WINSTAR	ATLANTA	34 PEACHTREE ST NW
GA	BELLSOUTH	VCD	WINSTAR	ATLANTA	34 PEACHTREE ST
GA	BELLSOUTH	AXT	WORLDCOM	ATLANTA	250 WILLIAMS ST NW
GA	BELLSOUTH	DMH	WORLDCOM	ATLANTA	250 WILLIAMS ST NW
GA	BELLSOUTH	DE4	WORLDCOM	MARIETTA	1176 FRANKLIN ST
GA	BELLSOUTH	DM5	XO	SMYRNA	4000 HIGHLANDS PKY SE
HI	VERIZON	DM5	TIME WARNER TELECOM	HONOLULU	737 BISHOP ST
IA	QWEST	4E	AT&T	DES MOINES	925 HIGH
IA	QWEST	5ES	AT&T	DES MOINES	925 HIGH
IA	QWEST	DMS10	CASCADE TELEPHONE CO.	CASCADE	108 FILLMORE ST SE
IA	QWEST	DMS1/200	FIBER COM	SIOUX CITY	901 STEUBEN ST
IA	QWEST	DMS10	GLOBAL CROSSING	OAKLAND	505 LINDEN ST
IA	QWEST	DMS100	HICKORYTECH	URBANDALE	2859 99TH ST
IA	QWEST	DMS1/200	IOWA NETWORK SERVICES, INC.	DES MOINES	312 8TH ST
IA	QWEST	DMS10	IOWA TELECOM	OXFORD	116 PRARIE
IA	QWEST	GT5	IOWA TELECOM	REDFIELD	1111 THOMAS ST
IA	QWEST	NT5	MCLEODUSA	DAVENPORT	5617 W LOCUST ST
IA	QWEST	DS	MCLEODUSA	DES MOINES	3540 SW 61ST ST
ID	QWEST	DS	CTC COMMUNICATIONS	BOISE	5883 W DRY CREEK RD
ID	QWEST	DSS	ELECTRIC LIGHTWAVE	BOISE	10452 EMERALD ST
ID	QWEST	DS	MCLEODUSA	BOISE	314 S 6TH ST
ID	QWEST	EWSD	TIME WARNER TELECOM	BOISE	199 N CAPITOL BLVD
IL	SBC	DS	ADELPHIA	CHICAGO	601 W POLK ST
IL	SBC	5E	ALLEGIANCE TELECOM	CHICAGO	140 S DEARBORN
IL	VERIZON	5E	AT&T	CHICAGO	717 S WELLS ST
IL	SBC	4E	AT&T	CHICAGO	85 W CONGRESS PKY
IL	SBC	NT5	AT&T	CHICAGO	85 W CONGRESS PKY
IL	SBC	DS	AT&T	CHICAGO	85 W CONGRESS PKY
IL	SBC	5E	AT&T	CHICAGO	10 S CANAL ST
IL	SBC	4E	AT&T	CHICAGO	10 S CANAL ST
IL	SBC	5E	AT&T	GLENVIEW	1900 PICKWICK
IL	SBC	DS	AT&T	LISLE	4513 WESTERN AVE
IL	SBC	4E	AT&T	OAK BROOK	1000 COMMERCE DR
IL	SBC	5E	AT&T	OAK BROOK	1000 COMMERCE DR
IL	SBC	5E	AT&T	ROLLING MEADOWS	3820 GOLF RD
IL	SBC	5E	CHOICE ONE	MACHESNEY PARK	9934 N ALPINE RD
IL	SBC	NT5	CORE COMMUNICATIONS	CHICAGO	65 E WACKER PL
IL	SBC	DS	ELEC	STERLING	2 EAST 3RD ST.
IL	SBC	DMH	FOCAL COMMUNICATIONS	CHICAGO	200 N LA SALLE ST
IL	SBC	DMH	FOCAL COMMUNICATIONS	ELK GROVE TOWNSHIP	1305 E ALGONQUIN RD
IL	SBC	NT5	GLOBAL CROSSING	CHICAGO	101 N. WACKER DR. SUITE 310
IL	SBC	DCO	GLOBAL CROSSING	POCAHONTAS	MIDLAND TEL CO
IL	SBC	DMS	GLOBALCOM	CHICAGO	520 S. FEDERAL
IL	SBC	5E2	ICG COMMUNICATIONS	CHICAGO	717 S WELLS ST
IL	SBC	NT5	INTERMEDIA COMMUNICATIONS	CHICAGO	205 N MICHIGAN AVE
IL	SBC	NT5	MADISON RIVER	PEKIN	416 MARGARET ST

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
IL	SBC	5E	MCLEODUSA	CHICAGO	427 S LA SALLE ST
IL	SBC	NT5	MCLEODUSA	SPRINGFIELD	528 S 5TH ST
IL	SBC	NT5	MPOWER	WHEELING	31 N WOLF
IL	SBC	NT5	NET-TEL CORP.	CHICAGO	717 S WELLS ST
IL	SBC	5E	PAETEC	CHICAGO	600 S FEDERAL ST
IL	VERIZON	NT5	RCN	CHICAGO	350 N ORLEANS ST
IL	SBC	DS	TDS	VERNON HILLS	50 LAKEVIEW PKY
IL	SBC	NT5	TELIGENT	CHICAGO	111 N CANAL ST
IL	SBC	NT5	WORLDCOM	BENSENVILLE	602 N YORK RD
IL	SBC	AXT	WORLDCOM	CHICAGO	800 S WELLS ST
IL	SBC	NT5	WORLDCOM	CHICAGO	550 W JACKSON
IL	SBC	AXT	WORLDCOM	CHICAGO	800 S WELLS ST
IL	SBC	DMH	WORLDCOM	ELK GROVE VILLAGE	955 ARTHUR AVE
IL	SBC	NT5	XO	CHICAGO	303 E WACKER DR
IL	SBC	NT5	XO	WOOD DALE	711 N EDGEWOOD AVE
IN	VERIZON	5EH	AT&T	EVANSVILLE	133-135 NW 5TH ST
IN	SBC	5E	AT&T	INDIANAPOLIS	112 W NORTH ST
IN	SBC	DMH	AT&T	INDIANAPOLIS	711 WEST HENRY ST
IN	SBC	VCD	CHOICE ONE	BLOOMINGTON TOWNSHIP	2599 W VERNAL PIKE
IN	VERIZON	5E	CHOICE ONE	FORT WAYNE	2730 E COLISEUM BLVD
IN	VERIZON	5E	CHOICE ONE	INDIANAPOLIS	701 W HENRY ST
IN	SBC	VCD	CHOICE ONE	KNIGHT TOWNSHIP	5727 OLD BOONVILLE HWY
IN	SBC	5E	CHOICE ONE	MISHAWAKA	221 RED COACH DR
IN	SBC	DE5	DIVERSIFIED COMMUNICATIONS INC	MCCORDSVILLE	6061 W. PENDLETON PIKE, RD. 67
IN	SBC	DS	FBN INDIANA	MICHIGAN CITY	724 FRANKLIN ST
IN	SBC	NT5	GLOBAL CROSSING	INDIANAPOLIS	700 HENRY ST
IN	SBC	DM5	GOLDEN HARBOR	INDIANAPOLIS	800 OLIVER AVE
IN	VERIZON	EWSD	INDIGITAL	FORT WAYNE	5312 WEST WASHINGTON CENTER ROAD
IN	SBC	NT5	INTERMEDIA COMMUNICATIONS	INDIANAPOLIS	550 KENTUCKY AV
IN	VERIZON	5E	KMC TELECOM	FORT WAYNE	1710 DIRECTORS ROW
IN	SBC	DS	LEVEL 3	INDIANAPOLIS	1902 S EAST ST
IN	SBC	DS	MCLEODUSA	FISHERS	7998 CENTERPOINT DR
IN	SBC	5EH	MICHIANA METRONET	FRANKFORT	257 W CLINTON ST
IN	SBC	DMT	MICHIANA METRONET	HARTFORD CITY	218 W FRANKLIN ST
IN	SBC	D12	TELIGENT	INDIANAPOLIS	5739 W MINNESOTA ST
IN	VERIZON	5E	TIME WARNER TELECOM	INDIANAPOLIS	1465 GENT AVE
IN	SBC	NT5	TOTALINK	EVANSVILLE	1301 W LLOYD EXPY
IN	SBC	DMH	TRIVERGENT	INDIANAPOLIS	701 W HENRY ST
IN	SBC	DMH	WESTEL	ANDERSON	121 E 11 ST
IN	SBC	DMH	WORLDCOM	INDIANAPOLIS	6835 HILLSDALE CT
KS	SBC	5E	ADELPHIA	WICHITA	266 N MAIN
KS	SBC	5E	AT&T	KANSAS CITY	7400 JOHNSON DR
KS	SBC	4E	AT&T	WICHITA	154 N BROADWAY ST
KS	SBC	5E	BIRCH TELECOM	WICHITA	3450 N ROCK RD
KS	SBC	5E	EVEREST CONNECTIONS	LENEXA	9669 LACKMAN RD
KS	SBC	NT5	IONEX TELECOMMUNICATIONS INC.	WICHITA	8201 E 34TH ST N
KS	SBC	5E	KMC TELECOM	TOPEKA	2444 SE LAKEWOOD BLVD

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
KS	SBC	DMT	RTSC COMMUNICATIONS	LENORA	LENORA
KS	SBC	DMT	RTSC COMMUNICATIONS	VICTORIA	VICTORIA KS
KS	SBC	DMH	TRIVERGENT	LENEXA	7945 BOND ST
KS	SBC	DMH	TRIVERGENT	WICHITA	8200 E 34 CIR N
KS	SBC	NT5	WORLDNET, LLC DBA SU	LAWRENCE	644 NEW HAMPSHIRE ST
KY	BELLSOUTH	5E	ADELPHIA	LOUISVILLE	962 S 3RD ST
KY	BELLSOUTH	4E	AT&T	LOUISVILLE	521 W CHESTNUT ST
KY	BELLSOUTH	DMS	AT&T	LOUISVILLE	521 W CHESTNUT ST
KY	BELLSOUTH	NT5	AT&T	LOUISVILLE	521 W CHESTNUT ST
KY	BELLSOUTH	5E	E.SPIRE	LOUISVILLE	462 S 4TH ST
KY	BELLSOUTH	5E	E-TEL	MURRAY	401 OLIVE ST
KY	BELLSOUTH	5E	ICG COMMUNICATIONS	LOUISVILLE	332 W BROADWAY ST
KY	BELLSOUTH	DS	LEVEL 3	LOUISVILLE	848 S 8TH ST
KY	VERIZON	D12	MIKROTEC COMMUNICATIONS	LEXINGTON	1001 WINCHESTER RD
KY	VERIZON	POI	NEWSOUTH COMMUNICATIONS	LEXINGTON	151 S MARTIN LUTHER KING BLVD
KY	VERIZON	D12	TOUCHTONE COMMUNICATIONS	LEXINGTON	250 W MAIN ST
KY	BELLSOUTH	DS	TOUCHTONE COMMUNICATIONS	PADUCAH	1158 JEFFERSON ST
KY	BELLSOUTH	5E	US LEC	LOUISVILLE	9780 ORMSBY STATION RD
KY	BELLSOUTH	DS	VISION	PADUCAH	923 WASHINGTON ST
LA	BELLSOUTH	5E	ADELPHIA	BATON ROUGE	301 MAIN ST
LA	BELLSOUTH	D12	ADVANCED TELCOM GROUP	BATON ROUGE	620 FLORIDA ST
LA	BELLSOUTH	4E	AT&T	BATON ROUGE	333 N 6TH ST
LA	BELLSOUTH	4E	AT&T	NEW ORLEANS	840 POYDRAS/520 BARONNE
LA	BELLSOUTH	DS	CENTURYTEL INC	SHREVEPORT	406 COTTON ST
LA	BELLSOUTH	VCD	COLUMBIA TELECOMM	NEW ORLEANS	1340 POYDRAS ST
LA	BELLSOUTH	NT5	COX	HARAHAN	338 EDWARDS AVE
LA	BELLSOUTH	DMT	CP-TEL NETWORK SERVICES, INC.	NATCHITOCHES	5909 HWY 1 BYPASS
LA	BELLSOUTH	5E	E.SPIRE	NEW ORLEANS	1250 POYDRAS AVE
LA	BELLSOUTH	DM5	INTERMEDIA COMMUNICATIONS	SHREVEPORT	724 MCNEIL ST
LA	BELLSOUTH	DS	ITC^DELTACOM	BATON ROUGE	446 NORTH BLVD
LA	BELLSOUTH	DS	ITC^DELTACOM	LAKE CHARLES	902 RAILROAD AVE
LA	BELLSOUTH	DS	ITC^DELTACOM	MONROE	117 HART ST
LA	BELLSOUTH	DS	ITC^DELTACOM	NEW ORLEANS	639 LOYOLA AVE
LA	BELLSOUTH	DS	ITC^DELTACOM	SCOTT	220 RUE BON SECOURS
LA	BELLSOUTH	DS	ITC^DELTACOM	SHREVEPORT	724 MCNEIL ST
LA	BELLSOUTH	5E	KMC TELECOM	BATON ROUGE	5758 ESSEN LN
LA	BELLSOUTH	5E	KMC TELECOM	MONROE	1908 PINE ST
LA	BELLSOUTH	5E	KMC TELECOM	SHREVEPORT	506 CADDO ST
LA	BELLSOUTH	DS	LEVEL 3	METAIRIE	3220 LAUSAT ST
LA	BELLSOUTH	DS	LOUISIANA COMPETITIVE TELECOMMUNICATIONS, INC.	KAPLAN	KAPLAN LN
LA	BELLSOUTH	D12	MADISON RIVER	NEW ORLEANS	1650 POYDRAS ST
LA	BELLSOUTH	NT5	MCLEODUSA	LAFAYETTE	201 W VERMILLION ST
LA	BELLSOUTH	DS	NETWORK TELEPH.	BATON ROUGE	566 LOBDELL AVE
LA	BELLSOUTH	DS	NETWORK TELEPH.	LAFAYETTE	110 CENTRAL ST
LA	BELLSOUTH	DS	NETWORK TELEPH.	NEW ORLEANS	115 GRUNER RD
LA	BELLSOUTH	DS	NETWORK TELEPH.	SHREVEPORT	602 CROCKETT ST
LA	BELLSOUTH	EWSD	NEWSOUTH COMMUNICATIONS	METAIRIE	1008 L AND A RD
LA	BELLSOUTH	5E	RESERVE LONG DIST	RESERVE	100 RTC DRIVE
LA	BELLSOUTH	DS	STRATOS TELECOM, INC.	MORGAN CITY	1750 YOUNGS RD

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
LA	BELLSOUTH	DMH	STRATOS TELECOM, INC.	NEW ORLEANS	701 POYDRAS ST
LA	BELLSOUTH	DS	STRATOS TELECOM, INC.	VENICE	523 JUMP BASIN RD @ WREHSE ON SHELL DOCK
LA	BELLSOUTH	VCD	XSPEDIUS CORP.	LAKE CHARLES	844 RYAN ST
MA	VERIZON	DS	ADELPHIA	SOMERVILLE	70 INNERBELT RD
MA	VERIZON	5E	ALLEGIANCE TELECOM	BOSTON	451 D ST
MA	VERIZON	5E	AT&T	BOSTON	230 CONGRESS ST
MA	VERIZON	NT5	AT&T	BOSTON	451 D ST
MA	VERIZON	4E	AT&T	CAMBRIDGE	250 BENT ST
MA	VERIZON	5E	AT&T	CAMBRIDGE	250 BENT ST
MA	VERIZON	5E	AT&T	FOXBORO	85 E. BELCHER RD
MA	VERIZON	5E	AT&T	FRAMINGHAM	825 WAVERLY STREET
MA	VERIZON	5E	AT&T	FRAMINGHAM	825 WAVERLY STREET
MA	VERIZON	5E	AT&T	LOWELL	12 WASHER ST
MA	VERIZON	5E	AT&T	MARLBORO	19 BRIGHAM ST
MA	VERIZON	5E	AT&T	NEEDHAM	95 WEXFORD ST
MA	VERIZON	4E	AT&T	SPRINGFIELD	351 BRIDGE ST
MA	VERIZON	4E	AT&T	WORCESTER	175 MAIN ST
MA	VERIZON	NT5	BROADVIEW	CHARLESTOWN	500 RUTHERFORD AVE SUITE 202
MA	VERIZON	5E	CHOICE ONE	SPRINGFIELD	1 FEDERAL ST - BUILDING 111-3
MA	VERIZON	5E	CHOICE ONE	WORCESTER	474 MAIN ST
MA	VERIZON	DCO	COMAV	FRAMINGHAM	111 SPEEN ST
MA	VERIZON	5E	CONVERSENT	WORCESTER	90 WASHINGTON ST
MA	VERIZON	5E	CORE COMMUNICATIONS	BOSTON	451 D ST
MA	VERIZON	NT5	FOCAL COMMUNICATIONS	CAMBRIDGE	ONE MAIN ST
MA	VERIZON	NT5	GLOBAL CROSSING	BOSTON	230 CONGRESS ST
MA	VERIZON	NT5	GLOBAL CROSSING	WESTFIELD	8 WILLIAMS WAY
MA	VERIZON	NT5	INTERMEDIA COMMUNICATIONS	CAMBRIDGE	179 5TH ST
MA	VERIZON	DMS	LIGHTSHIP TELECOM	WORCESTER	44 FRONT ST
MA	VERIZON	DMH	NECLEC LLC	SPRINGFIELD	167 MARKET PL.
MA	VERIZON	NT5	NET2000	CHARLESTOWN	500 RUTHERFORD AVE
MA	VERIZON	5E	NETWORK PLUS	CAMBRIDGE	185 BENT ST
MA	VERIZON	DS	NORFOLK COUNTY COMM	FRANKLIN	13 MAIN ST
MA	VERIZON	5E	PAETEC	BOSTON	230 CONGRESS ST
MA	VERIZON	5E	RCN	SOUTH BOSTON	105 W 1ST ST
MA	VERIZON	DMT	RICHMOND CONNECTIONS	RICHMOND	CANAAN RD & RICHMOND RD
MA	VERIZON	NT5	TELIGENT	CHARLESTOWN	500 RUTHERFORD AVE
MA	VERIZON	5E	WINSTAR	BOSTON	99 SUMMER ST
MA	VERIZON	NT5	WORLDCOM	ACTON	31 NAGOG PARK
MA	VERIZON	NT5	WORLDCOM	BOSTON	800 BOYLSTON ST
MA	VERIZON	DMH	WORLDCOM	CAMBRIDGE	300 BENT ST
MA	VERIZON	5EH	WORLDCOM	SPRINGFIELD	1 FEDERAL ST
MA	VERIZON	AXT	WORLDCOM	WALTHAM	580 WINTER ST
MA	VERIZON	NT5	XO	CAMBRIDGE	89 FULKERSON ST
MD	VERIZON	5E	ADELPHIA	BALTIMORE	300 W LEXINGTON ST
MD	VERIZON	5EH	ADVANCED TELCOM GROUP	ROCKVILLE	515 DOVER RD
MD	VERIZON	5E	ALLEGIANCE TELECOM	BALTIMORE	100 S CHARLES ST
MD	VERIZON	5E	AT&T	BALTIMORE	323 N CHARLES ST
MD	VERIZON	DMH	AT&T	BALTIMORE	25 S CHARLES ST
MD	VERIZON	NT5	AT&T	COLUMBIA	9151 RUMSEY RD
MD	VERIZON	4E	AT&T	MONROVIA	11026 FINGERBOARD RD

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
MD	VERIZON	VCD	BROADSTREET	LINTHICUM HEIGHTS	989 CORPORATE BLVD
MD	VERIZON	DMH	CAVALIER TELEPHONE	SALISBURY	128 E CHURCH ST
MD	VERIZON	NT5	COMCAST	BALTIMORE	8031 CORPORATE DR
MD	VERIZON	DMH	CORE COMMUNICATIONS	BALTIMORE	200 E LEXINGTON ST
MD	VERIZON	5E	E.SPIRE	LAUREL	14405 LAUREL PL
MD	VERIZON	NT5	GLOBAL CROSSING	BALTIMORE	1628 ST PAUL ST
MD	VERIZON	5E	KMC TELECOM	IJAMSVILLE	3005 BIG WOODS RD
MD	VERIZON	DM5	NET2000	BALTIMORE	300 W LEXINGTON ST
MD	VERIZON	5E	RCN	LANHAM	10000 DEREKWOOD LN
MD	VERIZON	5E	WINSTAR	BALTIMORE	201 N CHARLES ST
MD	VERIZON	NT5	WORLDCOM	BALTIMORE	111 MARKET PL
MD	VERIZON	DMH	WORLDCOM	BALTIMORE	900 FLEET ST
ME	VERIZON	DMT	CRC COMMUNICATIONS	PORTLAND	92 OAK ST
ME	VERIZON	EWSD	FAIRPOINT	FRYEBURG	9 MI E OF CONWAY NH
ME	VERIZON	DMT	LIGHTSHIP TELECOM	PORTLAND	1 CITY CTR
ME	VERIZON	DCO	LINCOLNVILLE COMMUNICATIONS	DAMARISCOTTA	18 MI E OF BATH
ME	VERIZON	DMT	MID-MAINE COMMUNICATIONS	KENDUSKEAG	646 KENDUSKEAG RD
ME	VERIZON	DS	OXFORD NETWORKS	NORWAY	27 FAIR ST
ME	VERIZON	5E	WORLDCOM	PORTLAND	380 CUMBERLAND(NYNEX) AVE
MI	SBC	5E	ADELPHIA	SOUTHFIELD	21355 MELROSE ST
MI	SBC	5E	ALLEGIANCE TELECOM	SOUTHFIELD	21455 MELROSE ST
MI	VERIZON	NT5	AT&T	DETROIT	445 STATE ST
MI	SBC	4E	AT&T	PLYMOUTH	1316 W ANN ARBOR RD
MI	SBC	5E	AT&T	PLYMOUTH	1316 ANN ARBOR RD W
MI	VERIZON	5E	AT&T	SOUTHFIELD	1000 TOWN CENTER DR
MI	SBC	DMT	BARAGA TELEPHONE COM	BARAGA	204 STATE ST
MI	SBC	5E	CENTURYTEL INC	GRAND RAPIDS	5005 STARR ST SE
MI	SBC	5E	CHOICE ONE	ANN ARBOR	220 E HURON ST
MI	SBC	5E	CHOICE ONE	PORTAGE	4750 COMMERCIAL AVE
MI	VERIZON	5E	COMCAST	WESTLAND	38205 N EXECUTIVE DR
MI	SBC	NT5	CORE COMMUNICATIONS	TROY	1179 MAPLELAWN DR
MI	SBC	5E	CTS TELECOM	CLIMAX	BOX 103 CLIMAX
MI	SBC	NT5	FOCAL COMMUNICATIONS	SOUTHFIELD	23800 W 10 MILE RD
MI	SBC	5E	KMC TELECOM	LANSING	240 E SOUTH ST
MI	SBC	5E	KMC TELECOM	PITTSFIELD TOWNSHIP	4575 CONCOURSE DR
MI	SBC	DS	LEVEL 3	GRAND RAPIDS	209 GRAHAM ST SW
MI	VERIZON	5E	MCLEODUSA	FLINT	4074 S LINDEN RD
MI	VERIZON	5E	MCLEODUSA	FLINT	G 4074 S LINDEN RD
MI	SBC	DS	MPOWER	SOUTHFIELD	300 GALLERIA OFFICECENTRE
MI	SBC	NT5	NET-TEL CORP.	SOUTHFIELD	21355 MELROSE ST
MI	VERIZON	5E	TC3 TELECOM	ADRIAN	1114F S WINTER ST
MI	SBC	DS	TDS	LANSING	5643 ENTERPRISE DR
MI	SBC	DS	TDS	PLYMOUTH	45053 FIVE MILE RD
MI	SBC	EWSD	TDS	WYOMING	1575 GEZON PKWY SW
MI	SBC	NT5	TELIGENT	SOUTHFIELD	2100 MELROSE
MI	SBC	NT5	TELIGENT	SOUTHFIELD	2100 MELROSE
MI	SBC	DMH	WORLDCOM	GRAND RAPIDS	2855 OAK INDUSTRIAL DR NE
MI	SBC	DMS	WORLDCOM	LANSING	5688 W GRAND RIVER AVE

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
MI	SBC	AXT	WORLDCOM	SOUTHFIELD	21500 MELROSE AVE
MI	SBC	DMH	WORLDCOM	SOUTHFIELD	21500 MELROSE AVE
MI	SBC	AXT	WORLDCOM	SOUTHFIELD	21500 MELROSE AVE
MI	SBC	DMS	WORLDCOM	TRAVERSE CITY	133 E STATE ST
MI	VERIZON	DM5	XO	SOUTHFIELD	21555 MELROSE AVENUE BLDG 8
MN	QWEST	5E	ALLEGIANCE TELECOM	MINNEAPOLIS	250 MARQUETTE AVE
MN	QWEST	5ES	AT&T	MINNEAPOLIS	511 11TH AVE S
MN	QWEST	4E	AT&T	MINNEAPOLIS	200 S 5TH ST
MN	QWEST	4E	AT&T	MINNEAPOLIS	200 S 5TH ST
MN	QWEST	5ES	AT&T	ROSEVILLE	2611 FAIRVIEW AVE N
MN	QWEST	DMS1/200	ESCHELON	MINNEAPOLIS	511 11TH AVE S
MN	QWEST	NT5	FOCAL COMMUNICATIONS	MINNEAPOLIS	222 S 9TH ST
MN	QWEST	DMS1/200	GLOBAL CROSSING	APPLE VALLEY	109 GARDEN VIEW DR
MN	QWEST	NT5	GLOBAL CROSSING	MINNEAPOLIS	511 11TH AVE S
MN	QWEST	EWSD	INTEGRA TELECOM	LAKE	55372 PRIOR
MN	QWEST	5ES	INTEGRA TELECOM	LAKE	55372 PRIOR
MN	QWEST	NT5	INTEGRA TELECOM	ST CLOUD	26 6TH AVE N
MN	QWEST	NT5	INTERMEDIA COMMUNICATIONS	MINNEAPOLIS	511 11TH AVE S
MN	QWEST	5ES	KMC TELECOM	GOLDEN VALLEY	730 BOONE AVE N
MN	QWEST	DS	LEVEL 3	MINNEAPOLIS	511 11TH AVE S
MN	QWEST	5ES	MCLEODUSA	MINNEAPOLIS	401 2ND AVE S
MN	QWEST	DMS100	ONVOY	PLYMOUTH	10300 6TH AVE N
MN	QWEST	DMS1/200	TELIGENT	EAGAN	3030 LEXINGTON AVE
MN	QWEST	DS	TIME WARNER TELECOM	MINNETONKA	5480 FELTL RD
MN	QWEST	DMS100	VAL-ED JOINT VENTURE LLP	MOORHEAD	702 MAIN AVE
MN	QWEST	DMS10	VAL-ED JOINT VENTURE LLP	MOORHEAD	702 MAIN AVE
MN	QWEST	5ES	WHLINK	ANNANDALE	110 OAK AVE N
MN	QWEST	VCD	WINSTAR	MINNEAPOLIS	608 2ND AVE S
MN	QWEST	5ES	WORLDCOM	MINNEAPOLIS	511 11TH AVE S
MN	QWEST	NT5	WORLDCOM	MINNEAPOLIS	331 2ND AVE S
MN	QWEST	5ES	WORLDCOM	ST PAUL	333 SIBLEY ST
MN	QWEST	DS	XO	MINNEAPOLIS	1200 WASHINGTON AVE N
MO	SBC	5E	ALLEGIANCE TELECOM	ST LOUIS	710 N TUCKER 4TH FLR
MO	SBC	DMS	ALLTEL	GREENVILLE	ALLIED TELEPHONE
MO	SBC	DS	ALLTEL	SPRINGFIELD	3330 E MONTCLAIR
MO	SBC	DMS	ALLTEL	VANDALIA	ALLIED TEL CO
MO	VERIZON	5E	AT&T	CREVE COEUR	11840 BORMAN DR
MO	SBC	4E	AT&T	HILLSBORO	8201 HWY 21
MO	SBC	4E	AT&T	KANSAS CITY	1425 OAK TRFY
MO	SBC	5E	AT&T	KANSAS CITY	324 E 11TH ST
MO	SBC	5E	AT&T	KANSAS CITY	1425 OAK TRFY
MO	SBC	4E	AT&T	ST LOUIS	2651 OLIVE
MO	SBC	5E	AT&T	ST LOUIS	2651 OLIVE
MO	SBC	4E	AT&T	ST.LOUIS	2651 OLIVE
MO	SBC	5E	BIRCH TELECOM	KANSAS CITY	324 E 11TH ST
MO	SBC	5E	BIRCH TELECOM	MARYLAND HEIGHTS	107 WELDON PKY
MO	SBC	NT5	DIGITAL TELEPORT	MARYLAND HEIGHTS	11111 DORSETT RD
MO	SBC	5E	E.SPIRE	KANSAS CITY	1100 MAIN ST, CITY CENTER SQUARE

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
MO	SBC	NT5	GLOBAL CROSSING	KANSAS CITY	1100 MAIN ST CENTER CITY
MO	SBC	NT5	INTERMEDIA COMMUNICATIONS	ST LOUIS	1445 N WARSON RD
MO	SBC	DS	LEVEL 3	KANSAS CITY	1100 WALNUT
MO	SBC	DS	MCLEODUSA	KANSAS CITY	1201 TROOST AVE
MO	SBC	DM5	MCLEODUSA	SPRINGFIELD	331 PARK CENTRAL E
MO	SBC	NT5	MCLEODUSA	ST LOUIS	210 N TUCKER BLVD
MO	SBC	NT5	MPOWER	ST LOUIS	11756 BORMAN DR
MO	SBC	DMH	ST LOUIS ELECTRONICS	HARVESTER	111 TOELLE
MO	SBC	1AE	ST LOUIS ELECTRONICS	ST LOUIS	3810 WASHINGTON
MO	SBC	NT5	TELIGENT	KANSAS CITY	2501 W PENNWAY ST
MO	SBC	DMH	TRIVERGENT	OLIVETTE	10405 BAUR BLVD
MO	SBC	DMH	TRIVERGENT	SPRINGFIELD	1521-1527 E LARK ST
MO	SBC	5E	WORLDCOM	KANSAS CITY	324 E 11TH ST
MO	SBC	AXT	WORLDCOM	MERILYN	11636 LACKLAND RD
MO	SBC	5E	WORLDCOM	SPRINGFIELD	940 E TRAFFICWAY ST
MO	SBC	AXT	WORLDCOM	ST LOUIS	11636 LACKLAND RD
MO	SBC	NT5	XO	MARYLAND HEIGHTS	2020 WESTPORT CENTER DR
MS	BELLSOUTH	5E	ADELPHIA	JACKSON	142 LEFLEUR SQUARE RD
MS	BELLSOUTH	4E	AT&T	JACKSON	210 E PEARL ST
MS	BELLSOUTH	DS	AT&T	JACKSON	210 E PEARL ST
MS	BELLSOUTH	NT5	CGI	JACKSON	700 S WEST ST RM 203
MS	BELLSOUTH	DS	DIXIENET COMMUNICATIONS	RIPLEY	301 N MAIN ST
MS	BELLSOUTH	DMT	GULFPINES COMMUNICATIONS	HATTIESBURG	200 FOXGATE AVE
MS	BELLSOUTH	DS	ITC^DELTACOM	GULFPORT	2221 17TH ST
MS	BELLSOUTH	DS	ITC^DELTACOM	JACKSON	125 S CONGRESS ST
MS	BELLSOUTH	5E	KMC TELECOM	GULFPORT	277 DEBUYS RD
MS	BELLSOUTH	DS	NETWORK TELEPH.	JACKSON	209 E CAPITOL ST
MS	BELLSOUTH	5E	WORLDCOM	JACKSON	317 E CAPITOL ST
MS	BELLSOUTH	5E	XSPEDIUS CORP.	JACKSON	108 BUSINESS PARK DR
MT	QWEST	VCD	AVISTA COMMUNICATIONS	BILLINGS	210 N 29TH ST
NC	BELLSOUTH	5E	ADELPHIA	CHARLOTTE	1027 N CHURCH ST
NC	BELLSOUTH	DMH	ALLTEL	GARNER	3651 JUNCTION BLVD
NC	BELLSOUTH	DMH	ALLTEL	GREENSBORO	111 W FLORIDA ST
NC	BELLSOUTH	DMH	ALLTEL	MATTHEWS	131 W MATTHEWS ST
NC	BELLSOUTH	4E	AT&T	CHARLOTTE	208 N CALDWELL ST
NC	BELLSOUTH	5E	AT&T	CHARLOTTE	208 N CALDWELL ST
NC	BELLSOUTH	DMH	AT&T	CHARLOTTE	200 S COLLEGE ST
NC	BELLSOUTH	4E	AT&T	DURHAM	CHIN PAGE RD
NC	BELLSOUTH	4E	AT&T	GREENSBORO	100 S EUGENE ST
NC	BELLSOUTH	NT5	AT&T	GREENSBORO	100 S EUGENE ST
NC	VERIZON	NT5	AT&T	RALEIGH	128 W HARGETT ST (121 W MORGAN ST)
NC	BELLSOUTH	5E	BTI	CHARLOTTE	701 E TRADE ST
NC	BELLSOUTH	5E	BTI	GREENSBORO	105 CREEK RIDGE RD
NC	BELLSOUTH	5E	BTI	RALEIGH	2111 HARROD ST
NC	BELLSOUTH	5E	BTI	WILMINGTON	3255 BURNT MILL DR
NC	BELLSOUTH	5E	CONNECT COMMUNICATIONS	CHARLOTTE	401 S COLLEGE ST
NC	VERIZON	DM5	CTC COMMUNICATIONS	CHARLOTTE	401 S COLLEGE ST
NC	VERIZON	5E	ICG COMMUNICATIONS	CHARLOTTE	401 S COLLEGE ST
NC	BELLSOUTH	NT5	INTERMEDIA COMMUNICATIONS	CHARLOTTE	9400-A SOUTHERN PINES BLVD.

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
NC	BELLSOUTH	DM5	INTERMEDIA COMMUNICATIONS	DURHAM	5400 S. MIAMI BLVD. SUITE #124
NC	VERIZON	DS	ITC^DELTACOM	ASHEVILLE	24 O HENRY AVE
NC	BELLSOUTH	DS	ITC^DELTACOM	CHARLOTTE	401 S COLLEGE ST
NC	VERIZON	DS	ITC^DELTACOM	DURHAM	2003 E USHWY 54
NC	BELLSOUTH	DS	ITC^DELTACOM	GREENSBORO	301 S ELM ST
NC	BELLSOUTH	DS	ITC^DELTACOM	RALEIGH	213 N HARRINGTON ST
NC	BELLSOUTH	DS	ITC^DELTACOM	WILMINGTON	4428A S COLLEGE RD
NC	BELLSOUTH	5E	KMC TELECOM	GREENSBORO	2423 BINFORD ST
NC	BELLSOUTH	5E	KMC TELECOM	WINSTON-SALEM	133 HICKS ST
NC	VERIZON	DS	LEVEL 3	CHARLOTTE	4021 ROSE LAKE DR
NC	BELLSOUTH	DS	LEVEL 3	GREENSBORO	105 CREEK RIDGE RD
NC	VERIZON	DS	LEVEL 3	RALEIGH	5301 DEPARTURE DR
NC	BELLSOUTH	NT5	MADISON RIVER	MEBANE	109 W WASHINGTON ST
NC	VERIZON	NT5	MADISON RIVER	MORRISVILLE	5150 MCCRIMMON PKY
NC	BELLSOUTH	DS	MPOWER	CHARLOTTE	3101 YORKMONT
NC	BELLSOUTH	DS	NETWORK TELEPH.	CHARLOTTE	208 N CALDWELL ST
NC	BELLSOUTH	DMH	TELIGENT	CHARLOTTE	3101 INTERNATIONAL AIRPORT DR
NC	BELLSOUTH	5E	TIME WARNER TELECOM	CHARLOTTE	1500 N SHARON AMITY RD
NC	BELLSOUTH	5E	TIME WARNER TELECOM	DURHAM	924 ELLIS RD
NC	BELLSOUTH	5E	TIME WARNER TELECOM	GREENSBORO	496 GALLIMORE DAIRY RD
NC	BELLSOUTH	DMH	TRIVERGENT	GREENSBORO	100 N GREENE ST
NC	VERIZON	5E	US LEC	CHARLOTTE	222 S CALDWELL ST
NC	BELLSOUTH	5E	US LEC	GREENSBORO	301 S ELM ST
NC	VERIZON	5E	US LEC	RALEIGH	2201 BRENTWOOD RD
NC	BELLSOUTH	5E	WINSTAR	CHARLOTTE	200 S COLLEGE ST
NC	VERIZON	NT5	WORLDCOM	MORRISVILLE	1500 PERIMETER PARK DR
NC	BELLSOUTH	5E	XSPEDIUS CORP.	GREENSBORO	1801 STANLEY RD
ND	QWEST	EWSD	IDEAONE	FARGO	3239 39TH ST SW
ND	QWEST	DMS10	INTER - COMMUNITY TELEPHONE CO.	BUFFALO	INTERCOMMUNITY TEL CO
ND	QWEST	5ES	MCLEODUSA	FARGO	2911 FIECHTNER DR
ND	QWEST	5ES	WESTERN CLEC CORPORATION	WEST FARGO	1447 44TH ST NW
NE	QWEST	NT5	ALLTEL	OMAHA	10630 BURT
NE	QWEST	DMS10	ARLINGTON TELEPHONE CO.	ARLINGTON	615 W DODGE INDEP CO
NE	QWEST	4E	AT&T	OMAHA	118 S 19TH ST
NE	QWEST	5ES	AT&T	OMAHA	118 S 19TH ST
NE	QWEST	4E	AT&T	OMAHA	4015 S 132ND ST
NE	QWEST	5ES	AT&T	OMAHA	2505 S 72ND ST
NE	QWEST	DMS1/200	COX	OMAHA	11505 W DODGE RD
NE	QWEST	DMS1/200	COX	OMAHA	11505 W DODGE RD
NE	QWEST	DS	LEVEL 3	BELLEVUE	1514 CHANDLER RD
NE	QWEST	DS	MCLEODUSA	OMAHA	1721 ST MARYS AVE
NE	QWEST	DCO	NORTHEAST NEBRASKA TELEPHONE CO.	JACKSON	1 BLK N OF HWY 20
NH	VERIZON	4E	AT&T	MANCHESTER	25 CONCORD ST
NH	VERIZON	D12	BAYRING	PORTSMOUTH	11 MANCHESTER SQ
NH	VERIZON	5E	CHOICE ONE	MANCHESTER	25 SUNDIAL AVE
NH	VERIZON	5E	CONVERSENT	NASHUA	145 TEMPLE ST
NH	VERIZON	EWSD	FAIRPOINT	MANCHESTER	1 SUNDIAL AVE
NH	VERIZON	DMT	LIGHTSHIP TELECOM	MANCHESTER	55 BRIDGE ST

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
NH	VERIZON	5E	WORLDCOM	MANCHESTER	1100 ELM ST
NH	VERIZON	5EH	WORLDCOM	NASHUA	97 MAIN ST
NJ	VERIZON	5E	ADELPHIA	PISCATAWAY	225 OLD NEW BRUNSWICK RD
NJ	VERIZON	DS	ADVANCED TELCOM GROUP	HAMILTON TOWNSHIP (MERCER)	3575 QUAKERBRIDGE RD
NJ	VERIZON	4E	AT&T	CAMDEN	12 N 7TH ST
NJ	VERIZON	NT5	AT&T	CAMDEN	12 N 7TH ST
NJ	VERIZON	5E	AT&T	CEDAR KNOLLS	88 HORSE HILL RD
NJ	VERIZON	4E	AT&T	FREEHOLD	175 W MAIN ST
NJ	VERIZON	4E	AT&T	HAMILTON SQUARE	1300 WHITE HORSE-HMLTN SQ
NJ	VERIZON	NT5	AT&T	NEWARK	95 WILLIAM ST
NJ	VERIZON	5E	AT&T	NEWARK	95 WILLIAM ST
NJ	VERIZON	4E	AT&T	ROCHELLE PARK	75 W PASSAIC ST
NJ	VERIZON	NT5	AT&T	ROCHELLE PARK	75 W PASSAIC ST
NJ	VERIZON	NT5	COMCAST	MOORESTOWN (BURLINGTON)	650 CENTERTON RD
NJ	VERIZON	NT5	FOCAL COMMUNICATIONS	JERSEY CITY	287-309 @WASHINGTON ST
NJ	VERIZON	NT5	GLOBAL CROSSING	NEWARK	1085 RAYMOND BLVD
NJ	VERIZON	NT5	GLOBAL NAPS	NEWARK	744 BROAD ST
NJ	VERIZON	DS	LEVEL 3	PRINCETON	211 COLLEGE RD E
NJ	VERIZON	EN4	LEVEL 3	WEEHAWKEN	300 BOULEVARD E
NJ	VERIZON	5E	RCN	NUTLEY	65 RIVER RD
NJ	VERIZON	5E	SNIP LINK	PENNSAUKEN	100A TWINBRIDGE DR
NJ	VERIZON	NT5	TELIGENT	TRENTON	50 W STATE ST
NJ	VERIZON	DS	WINSTAR	NEWARK	165 HALSEY ST
NJ	VERIZON	5E	WINSTAR	NEWARK	95 WILLIAM ST
NJ	VERIZON	5E	WINSTAR	NEW BRUNSWICK	18 PATTERSON ST
NJ	VERIZON	AXT	WORLDCOM	JERSEY CITY	101 HUDSON ST
NJ	VERIZON	DMH	WORLDCOM	LAUREL SPRINGS	29-35 BROADWAY AVE
NJ	VERIZON	NT5	WORLDCOM	NEW BRUNSWICK	23 HOME NEWS ROW
NJ	VERIZON	DMS	WORLDCOM	NEWARK	131 MARKET ST
NJ	VERIZON	NT5	XO	NEWARK	165 HALSEY ST
NM	QWEST	4E	AT&T	ALBUQUERQUE	111 3RD ST NW
NM	QWEST	5ES	E.SPIRE	ALBUQUERQUE	201 3RD ST NW
NM	QWEST	DS	LEVEL 3	ALBUQUERQUE	104 GOLD AVE SE
NM	QWEST	DS	MCLEODUSA	ALBUQUERQUE	505 MARQUETTE AVE NW
NM	QWEST	DM5	TIME WARNER TELECOM	ALBUQUERQUE	3830 SINGER BLVD NE
NM	QWEST	5ES	WORLDCOM	ALBUQUERQUE	422 GOLD AVE SW
NV	SBC	DS	ADVANCED TELCOM GROUP	RENO	STE 630
NV	SBC	4E	AT&T	RENO	10 N CENTER ST
NV	SBC	DMT	LIBERTY TELECOM	RENO	200 SOUTH VIRGINIA STREET
NV	SBC	5E	WORLDCOM	RENO	200 S VIRGINIA ST
NY	VERIZON	5E	ADELPHIA	BUFFALO	101 LASALLE AVE
NY	VERIZON	5E	ADELPHIA	SYRACUSE	6007 FAIRLAKES RD
NY	VERIZON	5E	ALLEGIANCE TELECOM	NEW YORK	111 8TH AVENUE 14TH FLOOR
NY	VERIZON	5E	ALLEGIANCE TELECOM	NEW YORK	60 HUDSON ST
NY	VERIZON	5E	AT&T	ALBANY	158 STATE ST.
NY	VERIZON	4E	AT&T	BUFFALO	65 FRANKLIN ST
NY	VERIZON	5E	AT&T	BUFFALO	325 DELAWARE AVE
NY	VERIZON	NT5	AT&T	HUNTINGTON	1444 E JERICHO TPKE

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
NY	VERIZON	5E	AT&T	MANHATTAN	811 10TH AVE
NY	VERIZON	4E	AT&T	MANHATTAN	811 10TH AVE
NY	VERIZON	4E	AT&T	MANHATTAN	33 THOMAS ST
NY	VERIZON	NT5	AT&T	MANHATTAN	33 THOMAS ST
NY	VERIZON	5E	AT&T	MANHATTAN	67 BROAD ST
NY	VERIZON	5E	AT&T	MANHATTAN	1 WORLD FINANCIAL (TOWER B) CTR
NY	VERIZON	5E	AT&T	MANHATTAN	250 VESEY ST
NY	VERIZON	5E	AT&T	MANHATTAN	216 E 45TH ST
NY	VERIZON	5E	AT&T	MANHATTAN	33 THOMAS ST
NY	VERIZON	5E	AT&T	QUEENS	9403 QUEENS BLVD
NY	VERIZON	4E	AT&T	SYRACUSE	201 S STATE ST
NY	VERIZON	NT5	AT&T	WHITE PLAINS	400 HAMILTON AVE.
NY	VERIZON	4E	AT&T	WHITE PLAINS	360 HAMILTON AVE
NY	VERIZON	NT5	BROADVIEW	QUEENS	3718 NORTHERN BLVD
NY	VERIZON	NT5	BROADVIEW	SYRACUSE	224 HARRISON ST
NY	VERIZON	5E	CABLEVISION LIGHTPATH	BETHPAGE	1111 STEWART AVE
NY	VERIZON	5E	CABLEVISION LIGHTPATH	HICKSVILLE	111 NEW SOUTH RD
NY	VERIZON	5E	CABLEVISION LIGHTPATH	WHITE PLAINS	151 FULTON AVE
NY	VERIZON	5E	CHOICE ONE	ALBANY	80 STATE ST
NY	VERIZON	5E	CHOICE ONE	BUFFALO	350 MAIN ST
NY	VERIZON	5E	CHOICE ONE	SYRACUSE	110 W FAYETTE ST
NY	VERIZON	EWSD	COMAV	BROOKLYN	25 CHAPEL ST
NY	VERIZON	5E	CONVERSENT	MELVILLE	201 OLD COUNTRY RD
NY	VERIZON	5E	CORE COMMUNICATIONS	MANHATTAN	67 BROAD ST
NY	VERIZON	DMH	CTSI	SYRACUSE	201 S STATE ST
NY	VERIZON	5E	E.SPIRE	NEW YORK	75 BROAD STREET 3RD FLOOR
NY	VERIZON	5E	EAGLE COMMUNICATIONS	MANHATTAN	60 E 56TH ST
NY	VERIZON	5E	EAGLE COMMUNICATIONS	MANHATTAN	601 W 26TH ST
NY	VERIZON	D12	FAIRPOINT	CHATHAM	19 RAILROAD AV
NY	VERIZON	NT5	FOCAL COMMUNICATIONS	MANHATTAN	325 HUDSON ST
NY	VERIZON	NT5	GLOBAL CROSSING	ALBANY	11 N PAERL ST SUITE 2000
NY	VERIZON	NT5	GLOBAL NAPS	MANHATTAN	1 FINANCIAL SQ
NY	VERIZON	DS	ICG COMMUNICATIONS	MANHATTAN	67 BROAD ST
NY	VERIZON	NT5	INTERMEDIA COMMUNICATIONS	MANHATTAN	160 W BROADWAY
NY	VERIZON	DM5	INTERNATIONAL TELCOM	MANHATTAN	160 W BROADWAY
NY	VERIZON	DS	LEVEL 3	ALBANY	314 N PEARL ST
NY	VERIZON	DS	LEVEL 3	BUFFALO	240 SCOTT ST
NY	VERIZON	DCO	METROPOLITAN TELECOMMUNICATIONS	MANHATTAN	67 BROAD ST
NY	VERIZON	DE4	METTEL	HEMPSTEAD	875 MERRICK AVE
NY	VERIZON	D12	MIDHUDSON_COMM	ALBANY	11 N PEARL ST
NY	VERIZON	DMS10	NECLEC LLC	NEW YORK CITY	32 OLD SLIP 4TH FLOOR
NY	VERIZON	NT5	NET2000	MANHATTAN	325 HUDSON ST
NY	VERIZON	DM5	NET-TEL CORP.	MANHATTAN	67 BROAD ST
NY	VERIZON	NT5	NORTHLAND NETWORKS	SYRACUSE	500 S SALINA ST
NY	VERIZON	MFS	NORTHLAND NETWORKS	UTICA	258 GENESEE ST
NY	VERIZON	VCD	PAETEC	ALBANY	1 COMMERCE PLZ
NY	VERIZON	5E	PAETEC	MANHATTAN	111 8TH AVE.
NY	VERIZON	5E	RCN	MANHATTAN	333 W. HOUSTON ST
NY	VERIZON	5E	RCN	QUEENS	3316 WOODSIDE AVE

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
NY	VERIZON	NT5	TELIGENT	MANHATTAN	111 8TH AVE
NY	VERIZON	NT5	THOUSAND ISLANDS COMMUNICATIONS	WATERTOWN	130 PARK PL
NY	VERIZON	5E	TIME WARNER TELECOM	COLONIE	10 AIRLINE DR
NY	VERIZON	DMT	WARWICK VALLEY TELEPHONE COMPANY	MIDDLETOWN	24 JOHN ST
NY	VERIZON	DS	WESTELCOM NETWORKS	PLATTSBURGH	24 MARGARET ST
NY	VERIZON	AXT	WORLDCOM	BUFFALO	325 DELAWARE - 1ST F
NY	VERIZON	5E	WORLDCOM	BUFFALO	325 DELAWARE AVE
NY	VERIZON	DMH	WORLDCOM	GARDEN CITY	845 STEWART AVE
NY	VERIZON	DMS	WORLDCOM	NEW YORK	111 8TH AVE
NY	VERIZON	AXT	WORLDCOM	NEW YORK	111 8TH AVE
NY	VERIZON	NT5	WORLDCOM	NEW YORK	560 WASHINGTON ST
NY	VERIZON	NT5	WORLDCOM	NEW YORK	60 HUDSON ST
NY	VERIZON	5E	WORLDCOM	WESTBURY (NASSAU)	48 SWALM ST
NY	VERIZON	5E	WORLDCOM	WHITE PLAINS	20 CHURCH ST @ MAIN ST
NY	VERIZON	NT5	XO	MANHATTAN	111 8TH AVE
NY	VERIZON	DMS	XO	NEW YORK	75 BROAD ST
OH	SBC	5E2	ALLEGIANCE TELECOM	CLEVELAND	1505 ROCKWELL AVE
OH	SBC	5E	ALLTEL	MONCLOVA TOWNSHIP	3530 BRIARFIELD BLVD
OH	SBC	4E	AT&T	CINCINNATI	229 W 7TH ST
OH	SBC	NT5	AT&T	CINCINNATI	358 GEST ST
OH	SBC	5E	AT&T	COLUMBUS	111 N 4TH ST
OH	SBC	NT5	AT&T	COLUMBUS	10 W BROAD ST
OH	SBC	5E	AT&T	COLUMBUS	111 N 4TH ST
OH	SBC	DMH	AT&T	INDEPENDENCE	7555 E PLEASANT VALLEY RD
OH	VERIZON	VCD	BUCKEYE TELESYSTEM	TOLEDO	4818 ANGOLA RD
OH	SBC	5E	CABLEVISION LIGHTPATH	STRONGSVILLE	8179 DOW CIR
OH	SBC	DS	CHOICE ONE	AKRON	600 S MAIN ST
OH	SBC	DS	CHOICE ONE	COLUMBUS	10 W BROAD ST
OH	SBC	DS	CHOICE ONE	DAYTON	111 W 1ST ST
OH	SBC	DM5	CORE COMMUNICATIONS	GARFIELD HEIGHTS	15166 NEO PKY
OH	SBC	DM5	CORE COMMUNICATIONS	WORTHINGTON	575 SCHERERS CT
OH	SBC	NT5	FOCAL COMMUNICATIONS	CLEVELAND	1228 EUCLID AVE
OH	SBC	NT5	GLOBAL CROSSING	CLEVELAND	1621 EUCLID AVE, SUITE 620
OH	SBC	5E2	ICG COMMUNICATIONS	AKRON	520 S MAIN ST #2435
OH	SBC	5E	ICG COMMUNICATIONS	CINCINNATI	105 E 4TH ST
OH	SBC	5E	ICG COMMUNICATIONS	CLEVELAND	1554 HAMILTON AVE
OH	SBC	5E	ICG COMMUNICATIONS	COLUMBUS	266 N 5TH ST
OH	SBC	5E	ICG COMMUNICATIONS	DAYTON	1 FIRST NATIONAL PLZ
OH	SBC	5E	ICG COMMUNICATIONS	GARFIELD HEIGHTS	15467 NEO PKY
OH	SBC	5E	ICG COMMUNICATIONS	WORTHINGTON	6185 HUNTLEY RD
OH	SBC	DMS	INTERMEDIA COMMUNICATIONS	CINCINNATI	150 E 4TH ST
OH	SBC	NT5	INTERMEDIA COMMUNICATIONS	CLEVELAND	1228 EUCLID AVE
OH	SBC	5E	KMC TELECOM	AKRON	175 TARBELL ST
OH	SBC	5E	KMC TELECOM	MORAINE	2870 SELLARS RD
OH	SBC	5E	KMC TELECOM	TOLEDO	6 CITY PARK AVE
OH	SBC	DS	LEVEL 3	AKRON	1 CASCADE PLZ

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
OH	SBC	DS	LEVEL 3	CLEVELAND	4000 CHESTER AVE
OH	SBC	DS	LEVEL 3	COLUMBUS	428 REYNOLDS AVE
OH	SBC	DS	LEVEL 3	DAYTON	732 GERMANTOWN ST
OH	SBC	DS	MCLEODUSA	CLEVELAND	1625 ROCKWELL AVE
OH	SBC	5E	MCLEODUSA	COLUMBUS	211 N GRANT AVE
OH	SBC	DS	MCLEODUSA	DAYTON	1 FIRST NATIONAL PLZ
OH	SBC	DS	MPOWER	CLEVELAND	1 EATON CTR
OH	SBC	DS	MPOWER	COLUMBUS	180 E BROAD ST
OH	SBC	D12	SPRINT	LEBANON	20 N MECHANIC ST
OH	SBC	NT5	TELIGENT	GARFIELD HEIGHTS	15248 NEO PKY
OH	SBC	5E	TIME WARNER TELECOM	BLUE ASH	11252 CORNELL PARK DR
OH	SBC	DS	TIME WARNER TELECOM	CINCINNATI	9490 MERIDIAN WAY
OH	SBC	5E	TIME WARNER TELECOM	COLUMBUS	1125 CHAMBERS RD
OH	SBC	DS	TIME WARNER TELECOM	DAYTON	1 S MAIN ST
OH	SBC	DMH	TRIVERGENT	AKRON	388 S MAIN ST
OH	SBC	DMH	TRIVERGENT	CINCINNATI	344 GEST ST
OH	SBC	NT5	WORLDCOM	CINCINNATI	312 PLUM ST
OH	SBC	DE4	WORLDCOM	CLEVELAND	1621 EUCLID AVE
OH	SBC	DMH	WORLDCOM	CLEVELAND	1150 W 3RD ST
OH	SBC	DMS	WORLDCOM	TOLEDO	26 N 11TH ST
OH	SBC	NT5	XO	CLEVELAND	815 SUPERIOR AVE NE
OH	SBC	NT5	XO	COLUMBUS	10 W BROAD ST
OK	SBC	4E	AT&T	OKLAHOMA CITY	121 DEAN A MCGEE
OK	SBC	5E	AT&T	OKLAHOMA CITY	111 DEAN A MCGEE
OK	SBC	4E	AT&T	TULSA	509 S DETROIT
OK	SBC	NT5	COX	OKLAHOMA CITY	2312 N W 10TH ST
OK	SBC	5E	E.SPIRE	TULSA	100 W 5TH ST
OK	SBC	DS	HARVEST TELECOM	TULSA	2488 E 81ST ST
OK	SBC	DS	INVENTIVE TECHNOLOGY	CLINTON	817 AVANT AVE
OK	SBC	DS	LEVEL 3	OKLAHOMA CITY	100 SE 8TH
OK	SBC	DS	LEVEL 3	TULSA	16719 E ADMIRAL PLACE
OK	SBC	NT5	LOGIX COMMUNICATIONS	OKLAHOMA CITY	100 W PARK AVE
OK	SBC	D12	LOGIX COMMUNICATIONS	TULSA	610 S MAIN ST
OK	SBC	NT5	MCLEODUSA	OKLAHOMA CITY	815 N BROADWAY
OK	SBC	DS	PIONEER LONG DISTANCE	ENID	225 W CHESTNUT AVE
OK	SBC	DS	PIONEER LONG DISTANCE	FAIRVIEW	110 S 7TH ST
OK	SBC	DMT	SURE-TEL	STILLWATER	504 S MAIN ST
OK	SBC	DMH	TRIVERGENT	TULSA	1437 S BOULDER AVE, SUITE 130
OK	SBC	5E	WORLDCOM	OKLAHOMA CITY	101 W PARK AVE
OK	SBC	5E	WORLDCOM	TULSA	4500 S 129TH EAST AVE
OR	VERIZON	DS	ADVANCED TELCOM GROUP	PORTLAND	810 SE BELMONT ST
OR	QWEST	VCD	ADVANCED TELCOM GROUP	SALEM	198 COMMERCIAL ST SE
OR	QWEST	5E	ALLEGIANCE TELECOM	TIGARD	10575 SW CASCADE AVE
OR	QWEST	5ES	AT&T	EUGENE	1515 WESTEC DR
OR	VERIZON	4E	AT&T	PORTLAND	819 SW OAK ST
OR	VERIZON	NT5	AT&T	PORTLAND	819 SW OAK ST
OR	VERIZON	5E	AT&T	TIGARD	10340 SW NIMBUS AVE
OR	QWEST	5ES	BEAVER CREEK TELEPHONE CO	BEAVER CREEK	BEAVER CREEK
OR	QWEST	DMS10	CENTURYTEL INC	AURORA	TEL UTILITIES AURORA
OR	VERIZON	DMH	ELECTRIC LIGHTWAVE	PORTLAND	6038 NE 78TH CT

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
OR	VERIZON	D12	ESCHELON	PORTLAND	921 SW WASHINGTON SUITE 410
OR	QWEST	DMS10	GERVAIS TELEPHONE CO. DBA DATAVISION COMM	GERVAIS	GERVAIS
OR	VERIZON	DS	GREAT WEST SVCS	BEAVERTON	20700 NW TRAIL WALK
OR	VERIZON	5E	INTEGRA TELECOM	BEAVERTON	10870 SW BARNES RD
OR	VERIZON	DMS	INTERNATIONAL TELCOM	PORTLAND	6058 NE 78TH CT
OR	VERIZON	DS	LEVEL 3	PORTLAND	1335 NW NORTHRUP ST
OR	VERIZON	DS	MCLEODUSA	PORTLAND	926 NW 13TH AVE
OR	VERIZON	DMH	NORTH COUNTY COMMUNICATIONS	PORTLAND	921 SW WASHINGTON
OR	VERIZON	D12	NORTH SANTIAM COMMUNICATIONS	STAYTON	STAYTON
OR	QWEST	5ES	RIO COMMUNICATIONS INC	EUGENE	151 W 7TH AVE
OR	QWEST	DS	RIO COMMUNICATIONS INC	MEDFORD	502 N CENTRAL AVE
OR	QWEST	DMS1/200	SPRINT	SHERIDAN	233 SE SAMPSON
OR	QWEST	DCO	ST. PAUL COOPERATIVE TELEPHONE ASSOCIATION	ST PAUL	SAINT PAUL
OR	VERIZON	DM5	TIME WARNER TELECOM	PORTLAND	520 SW 6TH AVE
OR	VERIZON	DS	WINSTAR	PORTLAND	6132 NE 112TH AVE
OR	VERIZON	NT5	WORLDCOM	PORTLAND	425 SW WASHINGTON ST
OR	VERIZON	AXT	WORLDCOM	PORTLAND	851 SW 6TH AVE
OR	QWEST	DS	XO	BEAVERTON	9000 SW NIMBUS AVE
PA	VERIZON	5E	ADELPHIA	HARRISBURG	1037 N 7TH ST
PA	VERIZON	5E	ADELPHIA	PHILADELPHIA	3020-3040 MARKET ST
PA	VERIZON	5E	ADELPHIA	PITTSBURGH	200 TECHNOLOGY DR
PA	VERIZON	5E	ADELPHIA	PITTSTON	1180 SATHERS DR
PA	VERIZON	5E	ADELPHIA	STATE COLLEGE	101 INNOVATIONS BLVD
PA	VERIZON	5E	ADELPHIA	YORK	140 W MARKET ST
PA	VERIZON	5E	ALLEGIANCE TELECOM	PHILADELPHIA	401 N BROAD ST
PA	VERIZON	5E	ARBROS	PHILADELPHIA	401 N BROAD ST
PA	VERIZON	4E	AT&T	HARRISBURG	210 PINE ST
PA	VERIZON	NT5	AT&T	PHILADELPHIA	500 S 27TH ST.
PA	VERIZON	4E	AT&T	PHILADELPHIA	500 S TWENTY-SEVENTH ST
PA	VERIZON	5E	AT&T	PITTSBURG	635 GRANT ST.
PA	VERIZON	4E	AT&T	PITTSBURGH	635 GRANT ST
PA	VERIZON	5E	AT&T	PITTSBURGH	2500 ALLEGHENY CTR MALL
PA	VERIZON	5E	AT&T	WAYNE	60 WEST AVE
PA	VERIZON	VCD	BROADSTREET	CARNEGIE	500 NOBLESTOWN RD
PA	VERIZON	NT5	BROADVIEW	HORSHAM	400 HORSHAM RD
PA	VERIZON	5E	CAVALIER TELEPHONE	WARMINSTER	965 THOMAS DR
PA	VERIZON	DS	CHOICE ONE	ALLENTOWN	7150 WINDSOR DR
PA	VERIZON	DS	CHOICE ONE	HARRISBURG	301 CHESTNUT ST
PA	VERIZON	5E	CHOICE ONE	PITTSBURGH	650 SMITHFIELD ST
PA	VERIZON	DS	CHOICE ONE	WILKES-BARRE	1090 HANOVER ST
PA	VERIZON	DMS	CORECOMM (ATX)	PHILADELPHIA	200 S 24TH ST
PA	VERIZON	NT5	CORECOMM (ATX)	PHILADELPHIA	200 S 24TH ST
PA	VERIZON	D12	CTSI	DALLAS	100 LAKE ST
PA	VERIZON	NT5	CTSI	HARRISBURG	31 S 31ST ST
PA	VERIZON	DMH	CTSI	LEESPORT	203 N CENTRE AV
PA	VERIZON	D12	D&E	LITITZ	19 S CEDAR ST
PA	VERIZON	5E	E.SPIRE	PHILADELPHIA	401 N BROAD ST
PA	VERIZON	5E	EAGLE COMMUNICATIONS	PHILADELPHIA	401 SOUTH BROAD ST.

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
PA	VERIZON	NT5	FOCAL COMMUNICATIONS	NORRISTOWN	1000 FORGE (BLDG C) AVE
PA	VERIZON	NT5	FOCAL COMMUNICATIONS	PHILADELPHIA	701 MARKET ST
PA	VERIZON	NT5	INTERMEDIA COMMUNICATIONS	PHILADELPHIA	401 N BROAD ST
PA	VERIZON	NT5	INTERMEDIA COMMUNICATIONS	PITTSBURGH	1400 PENN AVE
PA	VERIZON	DS	LEVEL 3	PITTSBURGH	143 S 25TH ST
PA	VERIZON	5E	METTEL	PHILADELPHIA	401 N BROAD ST
PA	VERIZON	NT5	NET2000	PHILADELPHIA	401 N BROAD ST
PA	VERIZON	D12	PENN TELECOM, INC.	GIBSONIA	4008 GIBSONIA RD
PA	VERIZON	5E	RCN	LOWER PROVIDENCE TOWNSHIP	1000 ADAMS AVE
PA	VERIZON	5E	RCN	NORTHAMPTON	5508 NOR BATH BLVD
PA	VERIZON	NT5	TELIGENT	PHILADELPHIA	401 N BROAD ST
PA	VERIZON	5E	US LEC	PHILADELPHIA	401 N BROAD ST
PA	VERIZON	5E	US LEC	PITTSBURGH	ALLEGHENY CTR MALL
PA	VERIZON	VCD	WINSTAR	PHILADELPHIA	1101 MARKET ST
PA	VERIZON	DS	WINSTAR	PITTSBURGH	707 GRANT ST
PA	VERIZON	DMH	WORLDCOM	KING OF PRUSSIA	630 CLARK AVE
PA	VERIZON	DE5	WORLDCOM	PHILADELPHIA	401 N. BROAD ST
PA	VERIZON	DE5	WORLDCOM	PHILADELPHIA	401 N. BROAD ST
PA	VERIZON	DMH	WORLDCOM	PITTSBURGH	2990 SASSAFRAS WAY
PA	VERIZON	NT5	XO	ALLENTOWN	974 MARCON BLVD
PA	VERIZON	DMH	XO	HARRISBURG	991 PEIFFERS LN
PA	VERIZON	NT5	XO	PHILADELPHIA	2400 MARKET ST
RI	VERIZON	NT5	AT&T	PROVIDENCE RI	275 PROMENADE ST.
RI	VERIZON	5E	CHOICE ONE	PROVIDENCE	121 S MAIN ST
RI	VERIZON	5E	CONVERSENT	PROVIDENCE	935 WESTMINSTER ST
RI	VERIZON	DMS	COX	WEST WARWICK	11 JAMES P MURPHY IND HWY
RI	VERIZON	DM5	INTERNATIONAL TELCOM	PROVIDENCE	304 CARPENTER ST
RI	VERIZON	DMS5	NECLEC LLC	NEWPORT	17 GOODWIN ST
RI	VERIZON	5E	WORLDCOM	PROVIDENCE	8 PARSONAGE ST
SC	BELLSOUTH	DS	ALLTEL	LEXINGTON	106 N CHURCH ST
SC	BELLSOUTH	DMH	ALLTEL	NORTH CHARLESTON	4920 APPIAN WAY
SC	BELLSOUTH	4E	AT&T	COLUMBIA	1645 HAMPTON ST
SC	BELLSOUTH	5E	AT&T	COLUMBIA	1645 HAMPTON ST
SC	BELLSOUTH	5E	BTI	CHARLESTON	176 GROGHAN SPUR RD
SC	BELLSOUTH	VCD	BTI	COLUMBIA	1401 MAIN ST
SC	BELLSOUTH	VCD	BTI	GREENVILLE	301 N MAIN ST
SC	BELLSOUTH	DS	DANIEL ISLAND MEDIA COMPANY	CHARLESTON	1350 DANIEL ISLAND DR
SC	BELLSOUTH	5E	E.SPIRE	COLUMBIA	1401 MAIN ST
SC	BELLSOUTH	5E	E.SPIRE	GREENVILLE	218 COLLEGE ST
SC	VERIZON	EWSD	HTC COMMUNICATIONS	COLLINS CREEK	HWY 707
SC	BELLSOUTH	DS	ITC^DELTACOM	CHARLESTON	1 CHARLOTTE ST & CONCORD ST
SC	BELLSOUTH	DS	ITC^DELTACOM	COLUMBIA	1426 MAIN ST
SC	BELLSOUTH	DS	ITC^DELTACOM	GREENVILLE	325 W MCBEE AVE
SC	BELLSOUTH	5E	KMC TELECOM	COLUMBIA	3770 LUCIUS RD
SC	BELLSOUTH	5E	KMC TELECOM	NORTH CHARLESTON	3310 MADONNA ST
SC	BELLSOUTH	5E	KMC TELECOM	SPARTANBURG	110 OLD LOWE RD
SC	BELLSOUTH	DS	LEVEL 3	GREENVILLE	301 N MAIN ST
SC	VERIZON	5E	NEWSOUTH COMMUNICATIONS	GREENVILLE	5 DUNCAN ST

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
SC	BELLSOUTH	NT5	SOUTH CAROLINA NET	COLUMBIA	1426 MAIN ST
SD	QWEST	NT5	BLACK HILLS FIBERCOM	RAPID CITY	809 DEADWOOD AVE
SD	QWEST	DMS10	EAST PLAINS TELECOM, INC.	HUDSON	HUDSON @ HUDSON CO
SD	QWEST	DM5	MIDCO COMM	SIOUX FALLS	410 S PHILLIPS AVE
SD	QWEST	DCO	SIOUX VALLEY TELEPHONE CO.	HUMBOLDT	> BLK W OF BANK
SD	QWEST	DMS100	SOUTH DAKOTA NETWORK METRO	SIOUX FALLS	2900 W 10TH ST
TN	BELLSOUTH	5E	ADELPHIA	NASHVILLE	2530 PERIMETER PLACE DR
TN	BELLSOUTH	DMH	AT&T	CHATTANOOGA	611 CHESTNUT ST
TN	BELLSOUTH	DMH	AT&T	KNOXVILLE	900 S GAY ST
TN	BELLSOUTH	4E	AT&T	KNOXVILLE	410 MAGNOLIA AVE / 439 DEPOT ST
TN	BELLSOUTH	4E	AT&T	MEMPHIS	231 COURT
TN	BELLSOUTH	DMH	AT&T	NASHVILLE	49 MUSIC SQUARE W
TN	BELLSOUTH	4E	AT&T	NASHVILLE	185 2ND AVE N
TN	BELLSOUTH	5E	BTI	KNOXVILLE	TWO CENTRE SQ
TN	BELLSOUTH	5E	BTI	NASHVILLE	150 4TH AVE N
TN	BELLSOUTH	DMS	ELECTRIC POWER BOARD OF CHATANOOGA	CHATTANOOGA	110 N GREENWOOD AVE
TN	BELLSOUTH	5E	ICG COMMUNICATIONS	NASHVILLE	315 DEADERICK ST
TN	BELLSOUTH	NT5	INTERMEDIA COMMUNICATIONS	MEMPHIS	3042 DIRECTORS ROW
TN	BELLSOUTH	NT5	INTERMEDIA COMMUNICATIONS	NASHVILLE	100 FRANKLIN ST
TN	BELLSOUTH	DS	ITC^DELTACOM	CHATTANOOGA	1329 SLAYTON ST
TN	BELLSOUTH	DS	ITC^DELTACOM	KNOXVILLE	5490 CENTRAL AVENUE PIKE
TN	BELLSOUTH	DS	ITC^DELTACOM	MEMPHIS	201 COURT AVE
TN	BELLSOUTH	NT5	ITC^DELTACOM	NASHVILLE	1301 4TH AVE S
TN	BELLSOUTH	5E	KMC TELECOM	CHATTANOOGA	1120 E 16TH ST
TN	BELLSOUTH	DS	LEVEL 3	MEMPHIS	3993 CROWFARM
TN	BELLSOUTH	DS	LEVEL 3	NASHVILLE	2990 SIDCO DR
TN	BELLSOUTH	DS	NETWORK TELEPH.	MEMPHIS	201 COURT AVE
TN	BELLSOUTH	DS	NETWORK TELEPH.	NASHVILLE	185 2ND AVE N
TN	BELLSOUTH	5E	NEWSOUTH COMMUNICATIONS	NASHVILLE	505 FESSLERS LN
TN	BELLSOUTH	5E	TIME WARNER TELECOM	MEMPHIS	5450 WINCHESTER RD
TN	BELLSOUTH	DMH	TRIVERGENT	NASHVILLE	940 3RD AVE N
TN	BELLSOUTH	5E	US LEC	KNOXVILLE	800 S GAY ST
TN	BELLSOUTH	VCD	US LEC	MEMPHIS	6625 LENOX PARK DR
TN	BELLSOUTH	5E	WORLDCOM	KNOXVILLE	406 UNION AVE SW
TN	BELLSOUTH	NT5	WORLDCOM	MEMPHIS	240 S. HOLLYWOOD
TN	BELLSOUTH	NT5	XO	MEMPHIS	5127 TRUSE
TN	BELLSOUTH	NT5	XO	NASHVILLE	101 MOLLOY ST
TN	BELLSOUTH	5E	XSPEDIUS CORP.	MEMPHIS	8110 CORDOVA RD
TN	BELLSOUTH	5E	XSPEDIUS CORP.	NASHVILLE	535 MAINSTREAM DR
TX	SBC	DM5	ADDISON CLEC NETWORK	DALLAS	5757 ALPHA RD
TX	SBC	5E	ADELPHIA	HOUSTON	2300 LYONS RD
TX	SBC	5E	ALLEGIANCE TELECOM	AUSTIN	11400 BURNET RD @ BUILDING 5
TX	VERIZON	5E	ALLEGIANCE TELECOM	DALLAS	1950 N STEMMONS FWY
TX	SBC	5E	ALLEGIANCE TELECOM	HOUSTON	1301 FANNIN ST
TX	SBC	5E	ALLEGIANCE TELECOM	SAN ANTONIO	5308 DISTRIBUTION DR
TX	SBC	NT5	AMERICAN LIGHTWAVE COMMUNICATIONS, INC.	HOUSTON	1415 LOUISIANA ST
TX	SBC	NT5	AMERICAN TELCO	DALLAS	1950 N STEMMONS FWY
TX	SBC	DMS	AMERICAN TELCO	FORT WORTH	810 HOUSTON ST

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
TX	SBC	DS	AMERICAN TELCO	HOUSTON	1415 LOUISIANA FLOOR D ROOM 2
TX	SBC	DCO	AMERICAN TELCO	SAN ANTONIO	301 BROADWAY, SUITE 386
TX	SBC	4E	AT&T	ADAMS	13900 CR 22
TX	SBC	5E	AT&T	ADAMS	12300 CR 22
TX	SBC	4E	AT&T	ANY TOWN	ANY ST
TX	VERIZON	NT5	AT&T	AUSTIN	120 W 9TH
TX	SBC	4E	AT&T	AUSTIN	915 COLORADO ST
TX	VERIZON	DMH	AT&T	DALLAS	13601 PRESTON- ANNEX TOWER RD
TX	VERIZON	4E	AT&T	DALLAS	4100 BRYAN ST
TX	VERIZON	5E	AT&T	DALLAS	4100 BRYAN ST
TX	VERIZON	NT5	AT&T	DALLAS	4100 BRYAN ST
TX	SBC	5E	AT&T	DALLAS	4100 BRYAN ST
TX	SBC	4E	AT&T	DALLAS	4100 BRYAN ST
TX	SBC	5E	AT&T	DALLAS	4100 BRYAN ST
TX	SBC	4E	AT&T	FORT WORTH	1116 HOUSTON ST
TX	VERIZON	DMH	AT&T	HOUSTON	1301 FANNIN SUITE 1290
TX	SBC	4E	AT&T	HOUSTON	1407 JEFFERSON ST
TX	SBC	4E	AT&T	HOUSTON	1407 JEFFERSON ST
TX	SBC	DS	AT&T	HOUSTON	1407 JEFFERSON ST
TX	SBC	5E	AT&T	HOUSTON	1407 JEFFERSON
TX	SBC	4E	AT&T	MIDLAND	410 W MISSOURI AVE
TX	SBC	4E	AT&T	SAN ANTONIO	105 AUDITORIUM CIR
TX	SBC	NT5	AT&T	SAN ANTONIO	105 AUDITORIUM CIR
TX	SBC	5E	AT&T	SEGUIN	RTE 2 BOX 400
TX	VERIZON	5E	ATS TELECOMMUNICATIONS SYSTEMS, INC D/B/A ATS	KYLE	168 KIRKHAM CIR
TX	SBC	5E	BAY STAR SATELLITE P	HOUSTON	4112 MANGUM RD
TX	VERIZON	DCO	CENTRAL TEXAS COMMUNICATIONS	SAN ANGELO	100 STRAWN RD
TX	VERIZON	VCD	COSERV	DALLAS	1950 N STEMMONS FWY
TX	SBC	D12	COSERV	FRISCO	3966 PARKWOOD BLVD
TX	SBC	DS	CYPRESS TELECOMMUNICATIONS CORPORATION	HOUSTON	777 WALKER ST #C190
TX	SBC	5E	E.SPIRE	AUSTIN	816 CONGRESS AVE
TX	SBC	5E	E.SPIRE	DALLAS	2323 BRYAN ST
TX	SBC	5E	E.SPIRE	EL PASO	201 E MAIN
TX	SBC	5E	E.SPIRE	FORT WORTH	309 W 7TH ST
TX	SBC	5E	E.SPIRE	SAN ANTONIO	323 BROADWAY
TX	SBC	DMT	FEC COMMUNICATIONS	ROYSE CITY	2884 BLACKLAND RD
TX	VERIZON	DMH	FOCAL COMMUNICATIONS	DALLAS	1950 N STEMMONS FWY
TX	VERIZON	NT5	FOCAL COMMUNICATIONS	HOUSTON	5959 CORPORATE DR
TX	VERIZON	5E	FORT BEND TELCO	KATY	1400 AVE A
TX	SBC	DS	GCEC TECHNOLOGIES	SHERMAN	217 N WALNUT ST
TX	VERIZON	NT5	GLOBAL CROSSING	DALLAS	2323 BRYAN STREET SUITE 900
TX	SBC	DM5	GRANDE COMMUNICATIONS NETWORKS	DALLAS	2323 BRYAN ST
TX	SBC	5E	ICG COMMUNICATIONS	AUSTIN	114 W 7TH ST
TX	SBC	5E	ICG COMMUNICATIONS	CORPUS CHRISTI	539 N CARANCAHUA ST
TX	VERIZON	5E	ICG COMMUNICATIONS	DALLAS	717 N HARWOOD ST
TX	VERIZON	5E	ICG COMMUNICATIONS	HOUSTON	2100 W LOOP S

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
TX	SBC	5E	ICG COMMUNICATIONS	SAN ANTONIO	703 URBAN LOOP
TX	SBC	NT5	INTERMEDIA COMMUNICATIONS	DALLAS	2323 BRYAN ST
TX	SBC	NT5	INTERMEDIA COMMUNICATIONS	HOUSTON	1301 FANNIN ST
TX	VERIZON	5E	IONEX TELECOMMUNICATIONS INC.	DALLAS	1201 MAIN ST
TX	SBC	5E	IONEX TELECOMMUNICATIONS INC.	HOUSTON	5433 WESTHEIMER RD
TX	SBC	DS	ITC^DELTACOM	AUSTIN	8201 E RIVERSIDE DR
TX	SBC	DS	ITC^DELTACOM	DALLAS	2020 LIVE OAK ST
TX	SBC	DS	ITC^DELTACOM	HOUSTON	12075 NORTH FWY
TX	SBC	5E	KMC TELECOM	CORPUS CHRISTI	5337 BEAR LN
TX	SBC	5E	KMC TELECOM	LONGVIEW	303 W HARRISON RD
TX	SBC	DMH	KO COMMUNICATIONS DB	GREENVILLE	2702 WESLEY
TX	SBC	DMH	KO COMMUNICATIONS DB	MOUNT PLEASANT	407 N. VAN BUREN
TX	SBC	5E	KO COMMUNICATIONS DB	MT. PLEASANT	2605 WEST FERGUSON RD
TX	VERIZON	DS	LEVEL 3	AUSTIN	4207 SMITH SCHOOL RD @ 78744
TX	SBC	DS	LEVEL 3	SAN ANTONIO	5130 SERVICE CENTER DR
TX	SBC	DMT	LOGIX COMMUNICATIONS	AMARILLO	203 W 8TH AVE
TX	SBC	NT5	LOGIX COMMUNICATIONS	AUSTIN	210 BARTON SPRINGS RD
TX	SBC	NT5	LOGIX COMMUNICATIONS	HOUSTON	1415 LOUISIANA ST
TX	SBC	DMH	LOGIX COMMUNICATIONS	SAN ANTONIO	106 S ST MARYS
TX	SBC	DS	MCLEODUSA	AUSTIN	1011 SAN JACINTO BLVD
TX	VERIZON	DM5	MCLEODUSA	DALLAS	600 N PEARL SOUTH TOWER
TX	SBC	DM5	MCLEODUSA	HOUSTON	12017 NORTH FWY
TX	VERIZON	DM5	MCLEODUSA	MCALLEN	900-1/2 BEECH AVE
TX	SBC	DM5	MCLEODUSA	SAN ANTONIO	106 S ST MARYS ST SUITE 210
TX	SBC	DMT	MCLEODUSA	VICTORIA	116 N MAIN ST
TX	VERIZON	DMT	MILLENIUM	KELLER	4700 KELLER HICKS RD
TX	SBC	DS	MPOWER	DALLAS	1950 N STEMMONS FWY
TX	SBC	DS	MPOWER	HOUSTON	5959 CORPORATE DR
TX	VERIZON	NT5	NET-TEL CORP.	ADDISON	16200 ADDISON RD
TX	VERIZON	DCO	NORTEX TELECOM	DENTON	3400 SUNDOWN BLVD
TX	SBC	5E	NTS COMMUNICATIONS, INC.	ABILENE	500 CHESTNUT ST STE. 936
TX	SBC	5E2	NTS COMMUNICATIONS, INC.	AMARILLO	208 W 8TH AVE
TX	SBC	5E	NTS COMMUNICATIONS, INC.	LUBBOCK	1220 BROADWAY, STE. 200
TX	SBC	5E	NTS COMMUNICATIONS, INC.	MIDLAND	415 W WALL ST
TX	SBC	5E	NTS COMMUNICATIONS, INC.	ODESSA	3801 DAWN AVE
TX	VERIZON	5E	OPTEL	DALLAS	3228 HALIFAX ST
TX	VERIZON	5E	OPTEL	HOUSTON	10300 WESTOFFICE DR
TX	SBC	DS	PATHWAY COM-TEL, INC.	BURLESON	3101 OLD STATE HWY 174
TX	SBC	5E	RELIANT ENERGY COMMUNICATIONS, INC.	HOUSTON	1111 LOUISIANA ST
TX	SBC	EWSD	TAYLOR	AUSTIN	800 BRAZOS ST
TX	SBC	EWSD	TAYLOR	DALLAS	13601 PRESTON RT 78 TELEPORT
TX	SBC	EWSD	TAYLOR	HOUSTON	1770 ST JAMES PL
TX	SBC	EWSD	TAYLOR	SAN ANTONIO	100 TAYLOR
TX	SBC	DMT	TECH TEL	LUBBOCK	3302 QUAKER AVE
TX	VERIZON	NT5	TELIGENT	DALLAS	1950 N STEMMONS FWY
TX	VERIZON	NT5	TELIGENT	HOUSTON	1301 FANNIN ST
TX	SBC	NT5	TELIGENT	SAN ANTONIO	8500 VICAR DR
TX	SBC	5E	TEXACOM CORPORATION	HOUSTON	1200 CLAY ST

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
TX	SBC	5E	TIME WARNER TELECOM	AUSTIN	12012 N MOPAC EXPY
TX	SBC	5E	TIME WARNER TELECOM	AUSTIN	3012 MONTOPOLIS DR
TX	VERIZON	5E	TIME WARNER TELECOM	DALLAS	1100 REGAL ROW
TX	VERIZON	EWSD	TIME WARNER TELECOM	HOUSTON	2900 WESLAYAN ST
TX	SBC	5E	TIME WARNER TELECOM	HOUSTON	8495 TIDWELL RD
TX	SBC	5E	TIME WARNER TELECOM	SAN ANTONIO	301 BROADWAY
TX	SBC	DS	TXU COMMUNICATIONS	CONROE	411 W PHILLIP
TX	SBC	NT5	TXU COMMUNICATIONS	DALLAS	400 S.AKARD
TX	SBC	DS	TXU COMMUNICATIONS	LUFKIN	321 N 1ST ST
TX	SBC	NT5	TXU COMMUNICATIONS	ROUND ROCK	214 FRONTIER TRL
TX	SBC	DS	WALLER CREEK COMMUNICATIONS	AUSTIN	306 SAN JACINTO BLVD
TX	SBC	5E	WESTERN INTEGRATED NETWORKS	DALLAS	2229 COCKRELL AVE
TX	SBC	5E	WES-TEX TELECOMMUNICATIONS	BIG SPRING	801 RUNNELS
TX	SBC	EWSD	WES-TEX TELECOMMUNICATIONS	BIG SPRING	711 SCURRY ST
TX	SBC	NT5	WORLDCOM	AUSTIN	2525 RIDGEPOINT DR
TX	SBC	AXT	WORLDCOM	DALLAS	1950 STEMMONS FWY
TX	SBC	AXT	WORLDCOM	DALLAS	1950 STEMMONS
TX	SBC	DMH	WORLDCOM	HOUSTON	1001 TEXAS
TX	SBC	NT5	WORLDCOM	HOUSTON	1701 LYONS AVE
TX	SBC	DMS	WORLDCOM	HOUSTON	1701 LYONS AVE
TX	VERIZON	NT5	WORLDCOM	IRVING	2477 GATEWAY DR
TX	VERIZON	NT5	WORLDCOM	RICHARDSON	400 INTERNATIONAL PKWY 2ND FL EAST
TX	VERIZON	NT5	WORLDCOM	SAN ANTIONIO	222 ROTARY
TX	SBC	NT5	WORLDCOM	SAN ANTONIO	700 N ST MARY'S
TX	SBC	DS	XO	AUSTIN	2100 S IH35
TX	SBC	DMS	XO	DALLAS	1300 MOCKINGBIRD LN
TX	SBC	DM5	XO	HOUSTON	2401 PORTSMOUTH
TX	SBC	DS	XO	SAN ANTONIO	6550 FIRST PARK TEN BLVD
UT	QWEST	4E	AT&T	SALT LAKE CITY	70 S STATE
UT	QWEST	5ES	AT&T	SALT LAKE CITY	70 S STATE
UT	QWEST	DMS100	AT&T	WEST VALLEY CITY	2440 S 1070 W
UT	QWEST	DMS1/200	ELECTRIC LIGHTWAVE	SALT LAKE CITY	265 E 100TH S
UT	QWEST	DMS100	ESCHELON	SALT LAKE CITY	215 S STATE ST
UT	QWEST	5E	ICG COMMUNICATIONS	WEST VALLEY CITY	2342 PRESIDENTS DR
UT	QWEST	5ES	INTEGRA TELECOM	SALT LAKE CITY	3676 CALIFORNIA AVE
UT	QWEST	DS	LEVEL 3	SALT LAKE CITY	572 S DELONG ST
UT	QWEST	DS	MCLEODUSA	SALT LAKE CITY	40 E 100 S
UT	QWEST	DS	WINSTAR	SALT LAKE CITY	161 REGENT ST
UT	QWEST	NT5	WORLDCOM	SALT LAKE CITY	175 S WEST TEMPLE
UT	QWEST	DMS100	XO	SALT LAKE CITY	118 S 1000 W
VA	VERIZON	5E	ADELPHIA	NORFOLK	2600 ELTHAM AVE
VA	VERIZON	DMH	ALLTEL	CHESAPEAKE	811 INDUSTRIAL AVE
VA	VERIZON	DMH	ALLTEL	RICHMOND	2501 GOODES BRIDGE RD
VA	VERIZON	4E	AT&T	ARLINGTON	900 S WALTER REED DR
VA	VERIZON	NT5	AT&T	FREDERICKSBURG	901 PRINCE EDWARD ST
VA	VERIZON	4E	AT&T	NORFOLK	120-36 W BUTE ST
VA	VERIZON	5E	AT&T	RICHMOND	703 E GRACE ST

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
VA	VERIZON	4E	AT&T	RICHMOND	2510 TURNER RD
VA	VERIZON	5E	AT&T	RICHMOND	5401 STAPLES MILLS RD
VA	VERIZON	VCD	BROADSTREET	CHESAPEAKE	510 INDEPENDENCE PARKWAY
VA	VERIZON	VCD	BROADSTREET	GLENALLEN	4206 PARK PLACE CT
VA	VERIZON	VCD	BROADSTREET	ROANOKE	5305 VALLEYPARK DR
VA	VERIZON	5E	CAVALIER TELEPHONE	HERNDON	360 HERNDON PKY
VA	VERIZON	5E	CAVALIER TELEPHONE	NORFOLK	1319 INGLESIDE RD
VA	VERIZON	5E	CAVALIER TELEPHONE	RICHMOND	2134 W LABURNUM AVE
VA	VERIZON	DS	COX	NEWPORT NEWS	179 LOUISE DR
VA	VERIZON	NT5	GLOBAL NAPS	RESTON	12347 SUNRISE VALLEY DR
VA	VERIZON	5E	ICG COMMUNICATIONS	VIENNA	8504 TYCO RD
VA	VERIZON	NT5	INTERMEDIA COMMUNICATIONS	FAIRFAX	2720-D PROSPERITY AVE
VA	VERIZON	5E	KMC TELECOM	PORTSMOUTH	969 BROAD ST
VA	VERIZON	5E	KMC TELECOM	ROANOKE	2151 HOLLINS RD NE
VA	VERIZON	DM5	NET2000	RICHMOND	701 E CARY ST
VA	VERIZON	5E	PAETEC	STERLING	22685 HOLIDAY PARK DR
VA	VERIZON	NT5	PICUS COMMUNICATIONS	NORFOLK	370 WORLD TRADE CTR
VA	VERIZON	DCO	TIDALWAVE TELEPHONE	FAIRFAX	14101 PARKE LONG CT
VA	VERIZON	NT5	URBAN MEDIA LONG DISTANCE	HERNDON	470 SPRINGPARK PL
VA	VERIZON	5E	US LEC	RICHMOND	7401 BEAUFONT SPRINGS DR
VA	VERIZON	5E	US LEC	TYSONS CORNER	7901 JONES BRANCH DR
VA	VERIZON	5E	US LEC	VIRGINIA BEACH	477 VIKING DR
VA	VERIZON	DMH	WORLDCOM	RESTON	12379 SUNRISE VALLEY DR
VT	VERIZON	5E	ADELPHIA	SOUTH BURLINGTON	102 KIMBALL AVE
VT	VERIZON	DMT	LIGHTSHIP TELECOM	BURLINGTON	7 BURLINGTON SQ
VT	VERIZON	EWSD	SOVERNET	WINOOSKI	276 E ALLEN ST
WA	VERIZON	5E	ADELPHIA	BELLEVUE	13410 NE 16TH ST
WA	VERIZON	DS	ADVANCED TELCOM GROUP	EVERETT	2939 COLBY AVE
WA	QWEST	VCD	ADVANCED TELCOM GROUP	TACOMA	1124 BROADWAY
WA	QWEST	VCD	ADVANCED TELCOM GROUP	YAKIMA	15 W YAKIMA AVE
WA	VERIZON	5E	ALLEGIANCE TELECOM	SEATTLE	1100 2ND AVE 1ST FLOOR
WA	VERIZON	5E	AT&T	REDMOND	11241 WILLOWS RD
WA	VERIZON	5E	AT&T	SEATTLE	1122 3RD AVE
WA	QWEST	4E	AT&T	SEATTLE	1122 3RD AVE
WA	VERIZON	5E	AT&T	SEATTLE	1215 4TH AVE
WA	VERIZON	5E	AT&T	SEATTLE	1122 3RD AVE
WA	QWEST	4E	AT&T	SPOKANE	501 W 2ND AVE
WA	VERIZON	4E	AT&T	TACOMA	757 S FAWCETT AVE
WA	QWEST	5ES	AT&T	TACOMA	757 S FAWCETT AVE
WA	QWEST	DMS100	AT&T	TACOMA	2324 PACIFIC AVE
WA	QWEST	5ES	AVISTA COMMUNICATIONS	SPOKANE	118 N STEVENS ST
WA	QWEST	DMS100	CENTURYTEL INC	GIG HARBOR	GIG HARBOR WA
WA	VERIZON	VCD	COMPUTERS 5, INC. DBA: LOCAL TEL	WENATCHEE	215 YAKIMA ST
WA	VERIZON	D12	ELECTRIC LIGHTWAVE	SEATTLE	1218 3RD AVE RM.410
WA	VERIZON	D12	ELECTRIC LIGHTWAVE	TUKWILA	13705 GATEWAY DR
WA	QWEST	DMS1/200	ELECTRIC LIGHTWAVE	VANCOUVER	4400 NE 77TH AVE
WA	VERIZON	NT5	ESCHELON	SEATTLE	1200 3RD AVE
WA	VERIZON	NT5	FOCAL COMMUNICATIONS	SEATTLE	1511 6TH AVE
WA	VERIZON	NT5	GLOBAL CROSSING	SEATTLE	2001 6TH AVE SUITE 1605

CLEC Circuit Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
WA	VERIZON	DS	GREAT WEST SVCS	BELLEVUE	10001 NE 1ST ST
WA	QWEST	DS	ICG COMMUNICATIONS	TUKWILA	12201 TUKWILA INTERNATIONAL BLVD
WA	VERIZON	5E	INTEGRA TELECOM	KENT	20435 72ND AVE S
WA	VERIZON	DMS	INTERNATIONAL TELCOM	SEATTLE	417 2ND AVE W
WA	VERIZON	DM5	INTERNATIONAL TELCOM	SPOKANE	9515 E 1ST AVE
WA	QWEST	DM5	MARATHON COMMUNICATIONS, INC.	SEATTLE	417 2ND AVE W
WA	QWEST	DM5	MCLEODUSA	SPOKANE	627 E SPRAGUE AVE
WA	VERIZON	DS	MCLEODUSA	TUKWILA	3311 S 120TH PL
WA	QWEST	5ES	RAINIER CABLE	EATONVILLE	5228 TANWAX BLVD
WA	VERIZON	NT5	TELIGENT	SEATTLE	1551 EASTLAKE AVE
WA	QWEST	EWSD	TIME WARNER TELECOM	SPOKANE	601 W MAIN AVE
WA	VERIZON	VCD	WINSTAR	SEATTLE	1000 2ND AVE
WA	QWEST	AXE10	WORLDCOM	KIRKLAND	11311 NE 120TH ST
WA	VERIZON	5E	WORLDCOM	KIRKLAND	11311 NE 120TH ST
WA	VERIZON	NT5	WORLDCOM	SEATTLE	2001 6TH
WA	VERIZON	DMS	XO	SEATTLE	1000 DENNY WAY
WA	QWEST	DMS1/200	XO	SPOKANE	155 SOUTH STEVENS ST
WI	SBC	5E	AT&T	MADISON	315 W MIFFLIN ST
WI	VERIZON	5E	AT&T	WEST ALLIS	2152 S 114TH ST
WI	SBC	5E	CHOICE ONE	APPLETON	10 COLLEGE AVE
WI	SBC	5E	CHOICE ONE	MADISON	222 W WASHINGTON AVE
WI	SBC	5E	CHOICE ONE	MILWAUKEE	744 N 4TH ST
WI	SBC	NT5	GLOBAL CROSSING	GREEN BAY	2020 ANGIE AVE
WI	SBC	5E	KMC TELECOM	MADISON	714 MARKET PL
WI	SBC	DS	LEVEL 3	MILWAUKEE	411 E WISCONSIN AVE
WI	SBC	DS	MCLEODUSA	GREEN BAY	314 N DANZ AVE
WI	SBC	DS	MCLEODUSA	MADISON	1858 WRIGHT ST
WI	SBC	VCD	MCLEODUSA	MILWAUKEE	731 N JACKSON ST
WI	SBC	DMH	NET LEC INC	GREEN BAY	1046 GRAY CT
WI	SBC	DMH	NORTHERN TELEPHONE & DATA CORP	OSHKOSH	144 HIGH AVE
WI	SBC	EWSD	TDS	APPLETON	10 COLLEGE AVE
WI	SBC	DMH	TDS	MADISON	6416 SCHROEDER RD
WI	SBC	EWSD	TDS	MADISON	3330 UNIVERSITY AVE
WI	SBC	EWSD	TDS	NEW BERLIN	2885 S 166TH ST
WI	SBC	DS	TIME WARNER TELECOM	BROOKFIELD	3235 INTERTECH DR
WI	SBC	5E	TIME WARNER TELECOM	MILWAUKEE	1710 N 6TH ST
WI	SBC	DE4	WORLDCOM	MILWAUKEE	330 E WELLS ST
WV	VERIZON	4E	AT&T	CHARLESTON	816 LEE ST E
WV	VERIZON	NT5	CTSI	CHARLESTON	233 VIRGINIA ST E
WV	VERIZON	DMH	CTSI	NITRO	2006 20TH ST
WV	VERIZON	5E	FIBERNET	CHARLESTON	211 BROAD ST
WV	VERIZON	DMH	NORTH COUNTY COMMUNICATIONS	CHARLESTON	405 CAPITOL ST
WV	VERIZON	5E	NTELOS	CHARLESTON	500 SUMMERS ST
WV	VERIZON	EWSD	STRATUS WAVE COMM	WHEELING	1025 MAIN ST

APPENDIX C. WIRE CENTERS IN THE TOP 100 MSAS WHERE CLECS HAVE ACQUIRED CUSTOMERS THROUGH PORTED NUMBERS

Wire Centers in the Top 100 MSAs Where CLECs Have Acquired Customers Through Ported Numbers																
	Percentage of Wire Centers Served by:				Percentage of BOC Switched Access Lines in Wire Centers Served by:											
	1 or more CLEC switch	2 or more	3 or more	4 or more	1 or more CLEC switch			2 or more			3 or more			4 or more		
MSA					Bus.	Res.	Tot.	Bus.	Res.	Tot.	Bus.	Res.	Tot.	Bus.	Res.	Tot.
1. Los Angeles-Long Beach, CA PMSA	92	91	88	86	99	100	99	99	99	99	99	99	99	99	98	98
2. New York, NY PMSA	95	86	79	73	99	99	99	97	97	97	97	95	96	95	91	92
3. Chicago, IL PMSA	89	82	77	69	98	99	98	97	96	96	95	94	94	92	89	91
4. Philadelphia, PA-NJ PMSA	95	88	81	75	100	99	99	99	97	97	98	95	96	97	93	94
5. Washington, DC-MD-VA-WV PMSA	63	53	50	47	91	89	90	89	83	86	88	80	84	86	76	81
6. Detroit, MI PMSA	92	79	70	61	98	99	98	96	94	95	94	91	92	90	84	87
7. Houston, TX PMSA	90	74	68	64	98	97	97	96	93	94	95	89	91	93	86	89
8. Atlanta, GA MSA	80	73	67	66	98	99	99	97	97	97	95	94	94	95	93	94
9. Dallas, TX PMSA	93	81	71	62	100	99	99	98	95	97	96	91	93	93	85	88
10. Boston, MA-NH PMSA	97	93	86	78	100	99	99	99	97	98	98	95	96	97	92	95
11. Riverside-San Bernardino, CA PMSA	Included in Los Angeles-Long Beach, CA PMSA															
12. Phoenix-Mesa, AZ MSA	78	69	66	61	99	98	98	98	97	97	98	96	97	97	92	93
13. San Diego, CA MSA	86	78	73	71	99	98	98	98	97	98	97	93	95	96	93	94
14. Minneapolis-St. Paul, MN-WI MSA	91	88	83	78	100	99	99	99	97	98	99	95	97	98	94	95
15. Orange County, CA PMSA	Included in Los Angeles-Long Beach, CA PMSA															
16. Nassau-Suffolk, NY PMSA	98	96	92	84	100	100	100	99	99	99	99	98	98	97	93	94
17. St. Louis, MO-IL MSA	66	45	39	36	94	91	92	83	77	79	80	72	75	79	70	73
18. Baltimore, MD PMSA	88	74	69	64	99	98	98	95	90	92	94	87	89	92	84	87
19. Oakland, CA PMSA	Included in San Francisco, CA PMSA															
20. Seattle-Bellevue-Everett, WA PMSA	100	96	96	88	100	100	100	99	98	99	99	98	99	99	96	97
21. Tampa-St. Petersburg-Clearwater, FL MSA	33	0	0	0	32	50	47	0	0	0	0	0	0	0	0	0

Wire Centers in the Top 100 MSAs Where CLECs Have Acquired Customers Through Ported Numbers

MSA	Percentage of Wire Centers Served by:				Percentage of BOC Switched Access Lines in Wire Centers Served by:											
	1 or more CLEC switch	2 or more	3 or more	4 or more	1 or more CLEC switch			2 or more			3 or more			4 or more		
					Bus.	Res.	Tot.	Bus.	Res.	Tot.	Bus.	Res.	Tot.	Bus.	Res.	Tot.
22. Pittsburgh, PA MSA	81	74	61	48	99	96	97	97	93	94	93	87	90	90	81	84
23. Cleveland-Lorain-Elyria, OH PMSA	90	88	80	78	99	98	99	99	97	98	98	93	95	97	92	94
24. Miami, FL PMSA	86	86	83	81	99	99	99	99	99	99	98	98	98	98	97	97
25. Denver, CO PMSA	97	81	81	81	100	100	100	98	96	97	98	96	97	98	96	97
26. Newark, NJ PMSA	95	90	88	83	100	99	99	98	96	97	97	94	95	95	92	93
27. Portland-Vancouver, OR-WA PMSA	90	86	81	81	99	98	98	99	97	98	98	97	97	98	97	97
28. San Francisco, CA PMSA	84	77	73	67	99	98	98	98	95	96	97	94	95	95	91	93
29. Kansas City, MO-KS MSA	88	85	82	79	99	98	98	99	97	98	98	96	97	97	94	95
30. San Jose, CA PMSA	95	89	84	79	100	100	100	100	100	100	98	94	96	97	91	94
31. Cincinnati, OH-KY-IN PMSA	100	50	0	0	100	100	100	35	56	51	0	0	0	0	0	0
32. FortWorth-Arlington, TX PMSA	Included in Dallas, TX PMSA															
33. Orlando, FL MSA	82	82	82	73	99	98	98	99	98	98	99	98	98	89	87	88
34. Sacramento, CA PMSA	78	53	47	47	99	96	97	95	87	91	91	83	86	91	83	86
35. San Antonio, TX MSA	77	70	60	57	99	96	97	98	95	96	93	89	90	92	88	89
36. Las Vegas, NV-AZ MSA	Served principally by Sprint															
37. Fort Lauderdale, FL PMSA	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
38. Indianapolis, IN MSA	76	61	48	45	98	94	96	94	86	89	90	80	84	89	78	82
39. Norfolk-Virginia Beach-Newport News, VA-NC MSA	82	78	76	67	98	96	97	96	93	94	96	93	94	95	89	91
40. Milwaukee-Waukesha, WI PMSA	100	85	74	65	100	100	100	98	96	97	95	92	93	90	86	87
41. Columbus, OH MSA	80	70	67	63	100	99	99	98	96	97	95	93	94	94	89	91
42. Charlotte-Gastonia-Rock Hill, NC-SC MSA	75	64	58	56	97	93	94	94	87	89	92	83	86	91	81	84
43. Bergen-Passaic, NJ PMSA	96	89	89	81	99	98	99	99	97	98	99	97	98	95	91	93
44. New Orleans, LA MSA	83	52	52	48	99	97	98	95	91	92	95	91	92	95	89	90

Wire Centers in the Top 100 MSAs Where CLECs Have Acquired Customers Through Ported Numbers																
	Percentage of Wire Centers Served by:				Percentage of BOC Switched Access Lines in Wire Centers Served by:											
	1 or more CLEC switch	2 or more	3 or more	4 or more	1 or more CLEC switch			2 or more			3 or more			4 or more		
MSA					Bus.	Res.	Tot.	Bus.	Res.	Tot.	Bus.	Res.	Tot.	Bus.	Res.	Tot.
45. Salt Lake City-Ogden, UT MSA	96	92	83	75	100	100	100	100	99	100	99	98	98	98	93	95
46. Greensboro-Winston Salem-High Point, NC MSA	88	83	71	63	99	97	97	99	96	97	98	92	94	97	87	90
47. Nashville, TN MSA	73	68	61	59	97	94	95	96	92	93	95	89	91	94	88	90
48. Austin-San Marcos, TX MSA	92	79	75	67	99	98	99	98	96	97	97	95	96	96	91	93
49. Buffalo-Niagara Falls, NY MSA	80	60	53	48	98	96	96	96	91	92	94	88	90	93	86	88
50. Middlesex-Somerset-Hunterdon, NJ PMSA	93	86	82	79	100	99	99	98	96	97	98	95	96	97	93	95
51. Hartford, CT MSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
52. Monmouth-Ocean, NJ PMSA	76	58	48	33	93	83	86	86	72	76	81	63	69	61	50	53
53. Raleigh-Durham-Chapel Hill, NC MSA	94	88	88	81	99	98	98	98	96	97	98	96	97	98	94	95
54. Memphis, TN-AR-MS MSA	84	72	64	60	99	98	99	95	94	94	91	87	88	90	87	87
55. Providence-Fall River-Warwick, RI-MA MSA	96	79	64	61	100	99	99	98	94	95	95	89	91	94	86	88
56. Jacksonville, FL MSA	88	85	76	68	99	97	98	98	97	97	95	91	92	92	84	87
57. Rochester, NY MSA	68	41	18	9	92	86	87	75	60	63	53	36	40	39	25	28
58. Grand Rapids-Muskegon-Holland, MI MSA	82	54	46	36	97	93	95	93	82	86	91	80	85	78	62	69
59. West Palm Beach-Boca Raton, FL MSA	94	88	88	88	100	100	100	98	98	98	98	98	98	98	98	98
60. Oklahoma City, OK MSA	84	69	63	53	100	99	99	94	89	91	93	85	88	91	81	85
61. Louisville, KY-IN MSA	85	85	80	80	99	99	99	99	99	99	97	96	97	97	96	97
62. Richmond-Petersburg, VA MSA	73	73	68	65	98	95	96	98	95	96	97	91	93	97	90	93
63. Dayton-Springfield, OH MSA	70	60	55	50	99	97	97	96	91	92	93	87	89	89	82	84

Wire Centers in the Top 100 MSAs Where CLECs Have Acquired Customers Through Ported Numbers																
	Percentage of Wire Centers Served by:				Percentage of BOC Switched Access Lines in Wire Centers Served by:											
					1 or more CLEC switch			2 or more			3 or more			4 or more		
MSA	1 or more CLEC switch	2 or more	3 or more	4 or more	Bus.	Res.	Tot.	Bus.	Res.	Tot.	Bus.	Res.	Tot.	Bus.	Res.	Tot.
64. Greenville-Spartanburg-Anderson, SC MSA	83	55	43	35	98	96	97	91	82	84	86	76	78	74	68	70
65. Fresno, CA MSA	43	29	29	24	94	92	93	89	83	85	89	83	85	84	75	78
66. Birmingham, AL MSA	90	68	65	61	99	97	97	94	85	87	93	82	85	92	79	83
67. Albany-Schenectady-Troy, NY MSA	64	55	41	39	97	92	93	96	90	91	92	83	86	92	81	84
68. Honolulu, HI MSA	85	51	5	0	94	99	96	76	92	82	14	36	22	0	0	0
69. Tucson, AZ MSA	84	68	58	53	100	99	99	98	89	92	95	83	86	94	80	84
70. Tulsa, OK MSA	63	52	44	33	95	90	92	91	80	84	84	76	79	79	64	70
71. Ventura, CA PMSA	67	56	44	44	96	92	93	91	85	87	88	75	79	88	75	79
72. Syracuse, NY MSA	66	51	40	40	96	90	92	94	85	87	91	80	83	91	80	83
73. Tacoma, WA PMSA	80	80	80	67	99	98	98	99	98	98	99	98	98	90	88	89
74. El Paso, TX MSA	69	46	0	0	97	89	92	88	71	77	0	0	0	0	0	0
75. Omaha, NE-IA MSA	86	71	62	62	100	98	99	98	95	96	98	93	95	98	93	95
76. Akron, OH PMSA	85	80	65	45	98	96	97	98	94	95	94	87	89	82	71	74
77. Albuquerque, NM MSA	69	63	56	56	95	88	90	94	84	87	92	80	84	92	80	84
78. Knoxville, TN MSA	68	59	50	41	95	90	92	94	87	89	90	81	83	85	75	77
79. Bakersfield, CA MSA	55	27	23	5	88	88	88	76	68	71	73	64	67	41	13	22
80. Gary, IN PMSA	38	19	0	0	60	53	56	38	32	34	0	0	0	0	0	0
81. Allentown-Bethlehem-Easton, PA MSA	80	65	55	50	94	90	91	93	87	89	90	82	84	87	78	81
82. Harrisburg-Lebanon-Carlisle, PA MSA	76	62	52	48	98	95	96	96	90	92	88	85	86	87	80	83
83. Scranton-Wilkes-Barre-Hazleton, PA MSA	75	71	67	58	98	95	96	98	94	95	95	89	91	86	77	80
84. Toledo, OH MSA	80	73	67	53	98	96	97	94	91	92	90	87	88	81	75	77
85. Youngstown-Warren, OH MSA	50	19	0	0	88	79	81	33	29	30	0	0	0	0	0	0
86. Baton Rouge, LA MSA	85	65	60	45	99	96	97	95	89	91	94	88	90	88	77	80
87. Sarasota-Bradenton, FL MSA	89	74	68	63	94	97	95	86	92	88	83	91	85	80	90	83

Wire Centers in the Top 100 MSAs Where CLECs Have Acquired Customers Through Ported Numbers

MSA	Percentage of Wire Centers Served by:				Percentage of BOC Switched Access Lines in Wire Centers Served by:											
	1 or more CLEC switch	2 or more	3 or more	4 or more	1 or more CLEC switch			2 or more			3 or more			4 or more		
					Bus.	Res.	Tot.	Bus.	Res.	Tot.	Bus.	Res.	Tot.	Bus.	Res.	Tot.
88. Wilmington-Newark, DE-MD PMSA	93	93	80	67	100	99	99	100	99	99	98	96	97	96	89	92
89. Springfield, MA MSA	81	73	58	38	98	95	96	97	94	95	91	85	87	78	70	72
90. Ann Arbor, MI PMSA	Included in Detroit, MI PMSA															
91. Little Rock-North Little Rock, AR MSA	74	65	43	35	97	92	94	92	86	88	79	64	69	76	57	64
92. Stockton-Lodi, CA MSA	78	56	0	0	98	97	97	86	81	82	0	0	0	0	0	0
93. Charleston-North Charleston, SC MSA	86	86	79	64	98	97	97	98	97	97	98	96	96	95	90	92
94. Jersey City, NJ PMSA	100	100	100	80	100	100	100	100	100	100	100	100	100	94	87	90
95. McAllen-Edinburg-Mission, TX MSA	11	11	0	0	50	24	32	50	24	32	0	0	0	0	0	0
96. Mobile, AL MSA	81	63	56	50	98	96	97	88	81	83	85	74	77	81	68	71
97. Vallejo-Fairfield-Napa, CA PMSA	92	62	31	31	100	99	100	93	92	93	69	67	68	69	67	68
98. New Haven-Meriden, CT PMSA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
99. Columbia, SC MSA	93	87	73	53	99	99	99	98	95	96	96	91	93	93	87	89
100. Wichita, KS MSA	67	52	30	26	99	96	97	94	91	92	87	75	79	86	72	77
Total for Top 100 MSAs	**83**	**73**	**65**	**60**	**98**	**97**	**97**	**96**	**93**	**94**	**93**	**89**	**91**	**91**	**86**	**88**

APPENDIX D. RATE EXCHANGE AREAS IN THE TOP 100 MSAS WHERE CLECS HAVE OBTAINED NXX CODES

Rate Exchange Areas in the Top 100 MSAs Where CLECs Have Obtained NXX Codes				
	Percentage of Rate Exchange Areas Served by:			
	1 or more CLEC switch	2 or more	3 or more	4 or more
1. Los Angeles-Long Beach, CA PMSA	96	86	74	60
2. New York, NY PMSA	96	85	85	66
3. Chicago, IL PMSA	74	57	30	8
4. Philadelphia, PA-NJ PMSA	99	94	94	75
5. Washington, DC-MD-VA-WV PMSA	90	75	75	51
6. Detroit, MI PMSA	88	84	66	48
7. Houston, TX PMSA	81	63	50	38
8. Atlanta, GA MSA	100	80	60	47
9. Dallas, TX PMSA	95	76	53	42
10. Boston, MA-NH PMSA	100	92	92	80
11. Riverside-San Bernardino, CA PMSA	Included in Los Angeles-Long Beach, CA PMSA			
12. Phoenix-Mesa, AZ MSA	50	31	25	25
13. San Diego, CA MSA	89	77	63	57
14. Minneapolis-St. Paul, MN-WI MSA	100	29	18	14
15. Orange County, CA PMSA	Included in Los Angeles-Long Beach, CA PMSA			
16. Nassau-Suffolk, NY PMSA	89	74	74	61
17. St. Louis, MO-IL MSA	24	10	6	0
18. Baltimore, MD PMSA	100	94	94	77
19. Oakland, CA PMSA	Included in San Francisco, CA PMSA			
20. Seattle-Bellevue-Everett, WA PMSA	98	85	73	63
21. Tampa-St. Petersburg-Clearwater, FL MSA	100	88	88	88
22. Pittsburgh, PA MSA	99	77	77	43
23. Cleveland-Lorain-Elyria, OH PMSA	91	83	43	26
24. Miami, FL PMSA	100	100	100	100
25. Denver, CO PMSA	79	50	50	43
26. Newark, NJ PMSA	97	86	86	72
27. Portland-Vancouver, OR-WA PMSA	81	53	42	36
28. San Francisco, CA PMSA	95	90	76	48
29. Kansas City, MO-KS MSA	44	22	17	11
30. San Jose, CA PMSA	91	82	82	73
31. Cincinnati, OH-KY-IN PMSA	50	0	0	0
32. Fort Worth-Arlington, TX PMSA	Included in Dallas, TX PMSA			
33. Orlando, FL MSA	100	100	100	100
34. Sacramento, CA PMSA	91	55	27	18
35. San Antonio, TX MSA	100	80	60	40
36. Las Vegas, NV-AZ MSA	Served principally by Sprint			
37. Fort Lauderdale, FL PMSA	100	100	100	100
38. Indianapolis, IN MSA	28	0	0	0
39. Norfolk-Virginia Beach-Newport News, VA-NC MSA	100	75	75	50
40. Milwaukee-Waukesha, WI PMSA	77	50	32	9
41. Columbus, OH MSA	61	48	22	0
42. Charlotte-Gastonia-Rock Hill, NC-SC MSA	86	73	45	36

Rate Exchange Areas in the Top 100 MSAs Where CLECs Have Obtained NXX Codes				
	Percentage of Rate Exchange Areas Served by:			
	1 or more CLEC switch	2 or more	3 or more	4 or more
43. Bergen-Passaic, NJ PMSA	100	100	100	72
44. New Orleans, LA MSA	62	31	24	21
45. Salt Lake City-Ogden, UT MSA	100	41	38	31
46. Greensboro-Winston Salem-High Point, NC MSA	67	67	58	42
47. Nashville, TN MSA	78	53	38	34
48. Austin-San Marcos, TX MSA	100	50	25	25
49. Buffalo-Niagara Falls, NY MSA	100	44	44	28
50. Middlesex-Somerset-Hunterdon, NJ PMSA	100	95	95	86
51. Hartford, CT MSA	NA	NA	NA	NA
52. Monmouth-Ocean, NJ PMSA	100	68	68	41
53. Raleigh-Durham-Chapel Hill, NC MSA	100	89	89	78
54. Memphis, TN-AR-MS MSA	62	46	31	23
55. Providence-Fall River-Warwick, RI-MA MSA	100	96	96	92
56. Jacksonville, FL MSA	92	62	54	38
57. Rochester, NY MSA	93	57	57	0
58. Grand Rapids-Muskegon-Holland, MI MSA	86	29	10	5
59. West Palm Beach-Boca Raton, FL MSA	100	100	100	100
60. Oklahoma City, OK MSA	86	33	14	5
61. Louisville, KY-IN MSA	75	50	25	25
62. Richmond-Petersburg, VA MSA	100	89	89	53
63. Dayton-Springfield, OH MSA	6	0	0	0
64. Greenville-Spartanburg-Anderson, SC MSA	96	54	29	21
65. Fresno, CA MSA	94	19	13	0
66. Birmingham, AL MSA	100	93	21	21
67. Albany-Schenectady-Troy, NY MSA	100	70	70	45
68. Honolulu, HI MSA	100	0	0	0
69. Tucson, AZ MSA	38	38	38	13
70. Tulsa, OK MSA	65	15	5	0
71. Ventura, CA PMSA	100	89	56	22
72. Syracuse, NY MSA	94	65	65	47
73. Tacoma, WA PMSA	100	57	43	43
74. El Paso, TX MSA	25	0	0	0
75. Omaha, NE-IA MSA	85	46	15	15
76. Akron, OH PMSA	30	10	0	0
77. Albuquerque, NM MSA	29	14	14	14
78. Knoxville, TN MSA	59	29	29	29
79. Bakersfield, CA MSA	93	29	14	0
80. Gary, IN PMSA	18	0	0	0
81. Allentown-Bethlehem-Easton, PA MSA	100	93	93	67
82. Harrisburg-Lebanon-Carlisle, PA MSA	100	77	77	46
83. Scranton-Wilkes-Barre-Hazleton, PA MSA	100	89	89	11
84. Toledo, OH MSA	71	43	29	14
85. Youngstown-Warren, OH MSA	0	0	0	0
86. Baton Rouge, LA MSA	50	50	50	20
87. Sarasota-Bradenton, FL MSA	100	71	71	43
88. Wilmington-Newark, DE-MD PMSA	100	91	91	55

Rate Exchange Areas in the Top 100 MSAs Where CLECs Have Obtained NXX Codes				
	Percentage of Rate Exchange Areas Served by:			
	1 or more CLEC switch	**2 or more**	**3 or more**	**4 or more**
89. Springfield, MA MSA	100	100	100	57
90. Ann Arbor, MI PMSA	Included in Detroit, MI PMSA			
91. Little Rock-North Little Rock, AR MSA	7	7	0	0
92. Stockton-Lodi, CA MSA	86	29	29	0
93. Charleston-North Charleston, SC MSA	100	50	38	38
94. Jersey City, NJ PMSA	100	100	100	100
95. McAllen-Edinburg-Mission, TX MSA	25	0	0	0
96. Mobile, AL MSA	83	50	17	17
97. Vallejo-Fairfield-Napa, CA PMSA	100	80	30	20
98. New Haven-Meriden, CT PMSA	NA	NA	NA	NA
99. Columbia, SC MSA	100	40	20	20
100. Wichita, KS MSA	67	13	4	4
Total for Top 100 MSAs	**85**	**65**	**56**	**41**

APPENDIX E. CLEC PACKET SWITCHES

This appendix tabulates the packet switches that CLECs operate. It is based on information from New Paradigm Resource Group's *CLEC Report 2002*.

This appendix includes the switches owned by CLECs that have declared bankruptcy. Most such CLECs are still operational (and some are now emerging from bankruptcy). Moreover, switches are a sunk investment, so if one company ceases to use its switch it is highly likely that another company will quickly seize the opportunity to do so (and will probably be able to obtain the switch at a fire-sale price). In addition, even though some CLECs may now be experiencing financial troubles, the fact that they were able to deploy so many switches at one time is still highly probative of the ability of CLECs to deploy switches generally. In any event, switches operated by CLECs that have declared bankruptcy (as of March 31, 2002) represent no more than 19 percent of the total counted here.

CLEC Packet Switches

State	CLEC	Number of Switches	Switch Type	City
AL	ITC^DELTACOM	2	2 ASCEND FRAME RELAY	ANNISTON
AL	ITC^DELTACOM	1	FRAME RELAY CASCADE 9000	ARAB
AL	AT&T	1	ERICCSON STP	BIRMINGHAM
AL	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	BIRMINGHAM
AL	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	BIRMINGHAM
AL	ITC^DELTACOM	3	2 CASCADE; 1 ATM	BIRMINGHAM
AL	NEWSOUTH COMMUNICATIONS	1	CISCO BPX 8600 & MGX 8850	BIRMINGHAM
AL	US LEC	1	LUCENT CBX500	BIRMINGHAM
AL	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	BIRMINGHAM
AL	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	HUNTSVILLE
AL	KNOLOGY BROADBAND	1	FORE ATM	HUNTSVILLE
AL	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	MOBILE
AL	ITC^DELTACOM	1	ASCEND FRAME RELAY	MOBILE
AL	NEWSOUTH COMMUNICATIONS	1	CISCO BPX 8600 & MGX 8850	MOBILE
AL	US LEC	1	LUCENT CBX500	MOBILE
AL	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	MONTGOMERY
AL	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	MONTGOMERY
AL	ITC^DELTACOM	1	ASCEND FRAME RELAY	MONTGOMERY
AL	KNOLOGY BROADBAND	1	FORE ATM	MONTGOMERY
AL	KNOLOGY BROADBAND	PLANNED	FORE ATM	HUNTSVILLE
AL	KNOLOGY BROADBAND	PLANNED	FORE ATM	MONTGOMERY
AR	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	LITTLE ROCK
AR	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	LITTLE ROCK
AR	LOGIX COMMUNICATIONS ENTERPRISES	1	CISCO ATM	LITTLE ROCK
AR	NUVOX COMMUNICATIONS	1	LUCENT AC 120	LITTLE ROCK
AZ	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	FLAGSTAFF
AZ	ALLEGIANCE TELECOM	1	CISCO BPX 8650	PHOENIX
AZ	AT&T	2	ERICCSON; N/A	PHOENIX
AZ	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	PHOENIX
AZ	ESCHELON TELECOM	1	NORTEL PASSPORT ATM	PHOENIX
AZ	GLOBAL CROSSING	1	LUCENT ASCEND	PHOENIX
AZ	INTERMEDIA COMMUNICATIONS	2	ASCEND 9000; ASCEND CBX 500	PHOENIX
AZ	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	PHOENIX

CLEC Packet Switches				
State	**CLEC**	**Number of Switches**	**Switch Type**	**City**
AZ	PAC-WEST TELECOMM	1	ALCATEL MEGAHUB 600E	PHOENIX
AZ	WINSTAR COMMUNICATIONS	3	NEWBRIDGE ATM	PHOENIX
AZ	WORLDCOM	1	N/A	PHOENIX
AZ	XO COMMUNICATIONS	1*	N/A	PHOENIX
AZ	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	TUCSON
AZ	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	TUCSON
AZ	NTS COMMUNICATIONS	PLANNED	N/A	PHOENIX
AZ	WESTERN INTEGRATED NETWORKS	PLANNED	N/A	PHOENIX
CA	AT&T	2	ERICCSON STP; N/A	ANAHEIM
CA	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	ANAHEIM
CA	ADVANCED TELCOM GROUP	1	N/A	COTATI
CA	ICG COMMUNICATIONS	1	AIN NODES	IRVINE
CA	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	LONG BEACH
CA	ALLEGIANCE TELECOM	1	CISCO BPX 8650	LOS ANGELES
CA	AT&T	2	ERICCSON STP; N/A	LOS ANGELES
CA	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	LOS ANGELES
CA	GLOBAL CROSSING	1	LUCENT ASCEND	LOS ANGELES
CA	GLOBALCOM	1	N/A	LOS ANGELES
CA	ICG COMMUNICATIONS	2	AIN NODES	LOS ANGELES
CA	INTERMEDIA COMMUNICATIONS	3*	ASCEND 9000; ASCEND CBX 500	LOS ANGELES
CA	NET2000 COMMUNICATIONS	1*	N/A	LOS ANGELES
CA	PAC-WEST TELECOMM	1	ALCATEL MEGAHUB 600E	LOS ANGELES
CA	US TELEPACIFIC D/B/A TELEPACIFIC	1	CISCO BPX 8620	LOS ANGELES
CA	WINSTAR COMMUNICATIONS	2	NEWBRIDGE ATM	LOS ANGELES
CA	AT&T	3	1 IP; 2 N/A	OAKLAND
CA	PAC-WEST TELECOMM	1	ALCATEL MEGAHUB 600E	OAKLAND
CA	ALLEGIANCE TELECOM	1	CISCO BPX 8650	ORAGNE
CA	ADVANCED TELCOM GROUP	1	N/A	PETALUMA
CA	ADVANCED TELCOM GROUP	1	N/A	ROHNERT PARK
CA	ALLEGIANCE TELECOM	1	CISCO BPX 8650	SACRAMENTO
CA	AT&T	1	ERICCSON STP	SACRAMENTO
CA	GLOBAL CROSSING	1	LUCENT ASCEND	SACRAMENTO
CA	ICG COMMUNICATIONS	1	AIN NODES	SACRAMENTO
CA	WESTERN INTEGRATED NETWORKS	1	N/A	SACRAMENTO
CA	WINSTAR COMMUNICATIONS	1	ASCEND 9000 FRAME RELAY	SACRAMENTO
CA	ALLEGIANCE TELECOM.	1	CISCO BPX 8650	SAN DIEGO
CA	AT&T	1	ATM	SAN DIEGO
CA	GLOBAL CROSSING	1	LUCENT ASCEND	SAN DIEGO
CA	ICG COMMUNICATIONS	1	AIN NODES	SAN DIEGO
CA	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	SAN DIEGO
CA	TIME WARNER TELECOM	4*	FORE/LUCENT/ASCEND	SAN DIEGO
CA	US TELEPACIFIC D/B/A TELEPACIFIC	1	CISCO BPX 8620	SAN DIEGO
CA	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	SAN DIEGO
CA	ALLEGIANCE TELECOM	1	CISCO BPX	SAN FRANCISCO
CA	AT&T	1	N/A	SAN FRANCISCO
CA	GLOBAL CROSSING	1	LUCENT ASCEND	SAN FRANCISCO
CA	ICG COMMUNICATIONS	1	AIN NODES	SAN FRANCISCO
CA	INTERMEDIA COMMUNICATIONS	3*	ASCEND 9000	SAN FRANCISCO
CA	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	SAN FRANCISCO
CA	NET2000 COMMUNICATIONS	1*	N/A	SAN FRANCISCO
CA	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	SAN FRANCISCO

CLEC Packet Switches				
State	**CLEC**	**Number of Switches**	**Switch Type**	**City**
CA	ALLEGIANCE TELECOM	1	CISCO BPX 8650	SAN JOSE
CA	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	SAN JOSE
CA	ICG COMMUNICATIONS	1	AIN NODES	SAN JOSE
CA	NET2000 COMMUNICATIONS	1*	N/A	SAN JOSE
CA	US TELEPACIFIC D/B/A TELEPACIFIC	1	CISCO BPX 8650	SAN JOSE
CA	WORLDCOM	1	N/A	SAN JOSE
CA	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	SANTA CLARA
CA	WINSTAR COMMUNICATIONS	1*	N/A	SANTA CLARA
CA	WINSTAR COMMUNICATIONS	1*	N/A	SANTA MONICA
CA	ADVANCED TELCOM GROUP	3	N/A	SANTA ROSA
CA	ICG COMMUNICATIONS	2	AIN NODES	SOUTHERN CALIFORNIA EDISON REGION
CA	PAC-WEST TELECOMM	1	ALCATEL MEGAHUB 600E	STOCKTON
CA	FOCAL COMMUNICATIONS	PLANNED	N/A	LOS ANGELES
CA	WESTERN INTEGRATED NETWORKS	PLANNED	N/A	LOS ANGELES
CA	WESTERN INTEGRATED NETWORKS	PLANNED	N/A	SAN DIEGO
CA	WESTERN INTEGRATED NETWORKS	PLANNED	N/A	SAN FRANCISCO
CO	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	COLORADO SPRINGS
CO	ICG COMMUNICATIONS	1	AIN NODES	COLORADO SPRINGS
CO	SUNWEST COMMUNICATIONS	1	N/A	COLORADO SPRINGS
CO	VANION	1	SPRING TIDE IP SERVICE SWITCH 5000	COLORADO SPRINGS
CO	ALLEGIANCE TELECOM	1	CISCO BPX 8650	DENVER
CO	AT&T	2	ERICCSON STP; N/A	DENVER
CO	ESCHELON TELECOM	1	NORTEL PASSPORT ATM	DENVER
CO	GLOBAL CROSSING	1	LUCENT ASCEND	DENVER
CO	ICG COMMUNICATIONS	1	AIN NODES	DENVER
CO	INTERMEDIA COMMUNICATIONS	2	ASCEND 9000; ASCEND CBX 500	DENVER
CO	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	DENVER
CO	NET2000 COMMUNICATIONS	1*	N/A	DENVER
CO	VANION	1	SPRING TIDE IP SERVICE SWITCH 5000	DENVER
CO	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	DENVER
CT	CTC COMMUNICATIONS	1	CISCO 8600/8800	FAIRFIELD
CT	AT&T	1	ATM	HARTFORD
CT	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	HARTFORD
CT	CTC COMMUNICATIONS	1	CISCO 8600/8800	MERIDEN
CT	CHOICE ONE COMMUNICATIONS	1	N/A	NEW HAVEN
CT	CABLEVISION LIGHTPATH	1*	N/A	NORWALK
CT	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	STAMFORD
DC	ALLEGIANCE TELECOM	1	CISCO BPX 8650	WASHINGTON, DC
DC	AT&T	1	ATM	WASHINGTON, DC
DC	BTI TELECOM	1	LUCENT ASCEND	WASHINGTON, DC
DC	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	WASHINGTON, DC
DC	GLOBAL CROSSING	1	LUCENT ASCEND	WASHINGTON, DC
DC	INTERMEDIA COMMUNICATIONS	5*	ASCEND 9000/ASCEND CBX 500	WASHINGTON, DC
DC	NET2000 COMMUNICATIONS	1	NORTEL 7480	WASHINGTON, DC
DC	US LEC	1	LUCENT CBX500	WASHINGTON, DC
DC	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	WASHINGTON, DC
DC	WORLDCOM	1	N/A	WASHINGTON, DC
DC	ARBROS COMMUNICATIONS	1	LUCENT ACCESS CONCENTRATOR	WASHINGTON, DC
FL	FLORIDA DIGITAL NETWORK	1*	N/A	COCOA

CLEC Packet Switches				
State	**CLEC**	**Number of Switches**	**Switch Type**	**City**
FL	INTERMEDIA COMMUNICATIONS	2*	ASCEND 9000	DAYTONA BEACH
FL	NEWSOUTH COMMUNICATIONS	1	CISCO BPX 8600 & MGX 8850	DESTIN
FL	AT&T	1	ATM	FORT LAUDERDALE
FL	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	FORT LAUDERDALE
FL	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	FORT LAUDERDALE
FL	FLORIDA DIGITAL NETWORK	1	CISCO	FORT LAUDERDALE
FL	INTERMEDIA COMMUNICATIONS	5*	ASCEND 9000; ASCEND CBX 500	FORT LAUDERDALE
FL	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	FORT MYERS
FL	INTERMEDIA COMMUNICATIONS	2*	ASCEND 9000	FORT MYERS
FL	US LEC	1	LUCENT CBX500	FORT MYERS
FL	INTERMEDIA COMMUNICATIONS	2*	N/A	GAINESVILLE
FL	AT&T	1	ERICCSON STP	JACKSONVILLE
FL	BTI TELECOM	1	LUCENT ASCEND	JACKSONVILLE
FL	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	JACKSONVILLE
FL	FLORIDA DIGITAL NETWORK	1	CISCO	JACKSONVILLE
FL	INTERMEDIA COMMUNICATIONS	4*	ASCEND 9000; ASCEND CBX 500	JACKSONVILLE
FL	ITC^DELTACOM	1	ASCEND FRAME RELAY	JACKSONVILLE
FL	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	JACKSONVILLE
FL	NEWSOUTH COMMUNICATIONS	1	CISCO BPX 8600 & MGX 8850	JACKSONVILLE
FL	US LEC	1	LUCENT CBX500	JACKSONVILLE
FL	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	JACKSONVILLE
FL	INTERMEDIA COMMUNICATIONS	1*	N/A	KEY WEST
FL	ALLEGIANCE TELECOM	1	CISCO BPX 8650	MIAMI
FL	AT&T	1	ATM	MIAMI
FL	BTI TELECOM	1	LUCENT ASCEND FRAME RELAY	MIAMI
FL	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	MIAMI
FL	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	MIAMI
FL	INTERMEDIA COMMUNICATIONS	7*	ASCEND 9000; ASCEND CBX 500	MIAMI
FL	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	MIAMI
FL	NET2000 COMMUNICATIONS	1*	N/A	MIAMI
FL	NETWORK PLUS	1*	N/A	MIAMI
FL	US LEC	1	LUCENT CBX500	MIAMI
FL	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	MIAMI
FL	INTERMEDIA COMMUNICATIONS	1*	N/A	OCALA
FL	ITC^DELTACOM	2	1 ATM; 1 ASCEND FRAME RELAY	OCALA
FL	AT&T	1	ATM	ORLANDO
FL	BTI TELECOM	1	LUCENT ASCEND	ORLANDO
FL	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	ORLANDO
FL	FLORIDA DIGITAL NETWORK	1	CISCO	ORLANDO
FL	INTERMEDIA COMMUNICATIONS	5*	ASCEND 9000; ASCEND CBX 500	ORLANDO
FL	NET2000 COMMUNICATIONS	1*	N/A	ORLANDO
FL	ORLANDO TELEPHONE COMPANY	1	CISCO MGX 8850	ORLANDO
FL	TIME WARNER TELECOM	4*	FORE;ALCATEL;LUCENT;ASCEND	ORLANDO
FL	US LEC	1	LUCENT CBX500	ORLANDO
FL	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	ORLANDO
FL	INTERMEDIA COMMUNICATIONS	2*	ASCEND 9000	PANAMA CITY
FL	KNOLOGY BROADBAND	1	FORE ATM	PANAMA CITY
FL	INTERMEDIA COMMUNICATIONS	2*	ASCEND 9000	PENSACOLA
FL	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	SAINT PETERSBURG
FL	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	TALLAHASSEE
FL	INTERMEDIA COMMUNICATIONS	5*	ASCEND 9000; ASCEND CBX 500	TALLAHASSEE

CLEC Packet Switches				
State	**CLEC**	**Number of Switches**	**Switch Type**	**City**
FL	ALLEGIANCE TELECOM	1	CISCO BPX 8650	TAMPA
FL	AT&T	1	ATM	TAMPA
FL	BTI TELECOM	1	LUCENT ASCEND	TAMPA
FL	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	TAMPA
FL	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	TAMPA
FL	FLORIDA DIGITAL NETWORK	1	CISCO	TAMPA
FL	GLOBAL CROSSING	1	LUCENT ASCEND	TAMPA
FL	INTERMEDIA COMMUNICATIONS	9*	ASCEND 9000; ASCEND CBX 500	TAMPA
FL	NET2000 COMMUNICATIONS	1*	N/A	TAMPA
FL	TIME WARNER TELECOM	4*	FORE/ALCATEL/LUCENT/ASCEND	TAMPA
FL	US LEC	1	LUCENT CBX500	TAMPA
FL	WINSTAR COMMUNICATIONS	2	NEWBRIDGE ATM	TAMPA
FL	WORLDCOM	1	N/A	TAMPA
FL	FLORIDA DIGITAL NETWORK	1	CISCO	WEST PALM BEACH
FL	INTERMEDIA COMMUNICATIONS	3*	ASCEND 9000	WEST PALM BEACH
FL	US LEC	1	LUCENT CBX500	WEST PALM BEACH
FL	FLORIDA DIGITAL NETWORK	1	CISCO	WINTER PARK
FL	BTI TELECOM	PLANNED	LUCENT ATM	MIAMI
FL	KNOLOGY BROADBAND	PLANNED	FORE ATM	MIAMI
GA	ALLEGIANCE TELECOM	1	CISCO BPX 8650	ATLANTA
GA	AT&T	2	ERICCSON STP; N/A	ATLANTA
GA	BTI TELECOM	1	LUCENT ASCEND FRAME RELAY	ATLANTA
GA	COX COMMUNICATIONS	1*	N/A	ATLANTA
GA	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	ATLANTA
GA	GLOBAL CROSSING	1	LUCENT ASCEND	ATLANTA
GA	GLOBALCOM	1	N/A	ATLANTA
GA	ICG COMMUNICATIONS	1	AIN NODES	ATLANTA
GA	INTERMEDIA COMMUNICATIONS	8*	ASCEND 9000; ASCEND CBX 500	ATLANTA
GA	ITC^DELTACOM	3	2 FRAME RELAY CASCADE 900; 1 ATM	ATLANTA
GA	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	ATLANTA
GA	NETWORK TELEPHONE	1*	N/A	ATLANTA
GA	NEWSOUTH COMMUNICATIONS	1	CISCO BPX 8600 & MBX 8850	ATLANTA
GA	US LEC	1	LUCENT CBX500	ATLANTA
GA	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	ATLANTA
GA	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	AUGUSTA
GA	KNOLOGY BROADBAND	1	NORTEL DPN 10	AUGUSTA
GA	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	COLUMBUS
GA	KNOLOGY BROADBAND	1	FORE ATM	COLUMBUS
GA	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	SAVANNAH
GA	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	SAVANNAH
GA	ITC^DELTACOM	1	CASCADE 9000	WEST POINT
GA	BTI TELECOM	PLANNED	LUCENT ATM	ATLANTA
GA	KNOLOGY BROADBAND	PLANNED	FORE ATM	COLUMBUS
HI	TIME WARNER TELECOM	31*	FORE ALCATEL	HONOLULU
HI	WINSTAR COMMUNICATIONS	1	FRAME RELAY	HONOLULU
IA	FOREST CITY TELECOM	PLANNED	N/A	FOREST CITY
ID	WINSTAR COMMUNICATIONS	1	FRAME RELAY	BOISE
IL	DIGITAL PIPELINE COMMUNICATIONS	1*	N/A	ALGONQUIN
IL	ADELPHIA BUSINESS SOLUTIONS	1	N/A	CHICAGO
IL	ALLEGIANCE TELECOM	1	CISCO BPX 8650	CHICAGO

CLEC Packet Switches				
State	**CLEC**	**Number of Switches**	**Switch Type**	**City**
IL	AT&T	4	ERICCSON STP; N/A	CHICAGO
IL	CORECOMM	1*	N/A	CHICAGO
IL	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	CHICAGO
IL	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	CHICAGO
IL	GLOBAL CROSSING	1	LUCENT ASCEND	CHICAGO
IL	GLOBALCOM	1	N/A	CHICAGO
IL	INTERMEDIA COMMUNICATIONS	5*	ASCEND 9000; ASCEND CBX 500	CHICAGO
IL	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	CHICAGO
IL	NET2000 COMMUNICATIONS	1*	N/A	CHICAGO
IL	RCN	1	N/A	CHICAGO
IL	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	CHICAGO
IL	DIGITAL PIPELINE COMMUNICATIONS	1*	N/A	CRYSTAL LAKE
IL	AT&T	1	N/A	LISLE
IL	MCLEODUSA	1	MAGELLAN ILO	PEORIA
IL	CHOICE ONE COMMUNICATIONS	1	LUCENT/CISCO	ROCKFORD
IL	AT&T	1	N/A	ROLLING MEADOWS
IN	MCLEODUSA	1	N/A	BLOOMINGTON
IN	MCLEODUSA	1	N/A	EVANSVILLE
IN	AT&T	2	ATM; FRAME RELAY	INDIANAPOLIS
IN	CHOICE ONE COMMUNICATIONS	1	CISCO	INDIANAPOLIS
IN	GLOBAL CROSSING	1	LUCENT ASCEND	INDIANAPOLIS
IN	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	INDIANAPOLIS
IN	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	INDIANAPOLIS
IN	NUVOX COMMUNICATIONS	1	LUCENT AC 120	INDIANAPOLIS
IN	TIME WARNER TELECOM	10	FORE/ALCATEL/LUCENT/ASCEND	INDIANAPOLIS
IN	MCLEODUSA	1	N/A	MERRILLVILLE
IN	CHOICE ONE COMMUNICATIONS	1	LUCENT/CISCO ATM	SOUTH BEND
IN	MCLEODUSA	1	N/A	SOUTH BEND
IN	MCLEODUSA	1	N/A	TERRE HAUTE
KS	LOGIX COMMUNICATIONS ENTERPRISES	1	CISCO ATM	KANSAS CITY
KS	NUVOX COMMUNICATIONS	1	LUCENT AC 120	KANSAS CITY
KS	GLOBAL CROSSING	1	LUCENT ASCEND	TOPEKA
KS	LOGIX COMMUNICATIONS ENTERPRISES	1	CISCO ATM	WICHITA
KS	NUVOX COMMUNICATIONS	1	LUCENT AC 120	WICHITA
KY	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	LEXINGTON
KY	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	LEXINGTON
KY	AT&T	1	ERICCSON STP	LOUISVILLE
KY	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	LOUISVILLE
KY	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	LOUISVILLE
KY	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	LOUISVILLE
KY	NEWSOUTH COMMUNICATIONS	1	CISCO BPX 8600 & MGX 8850	LOUISVILLE
KY	US LEC	1	LUCENT CBX500	LOUISVILLE
KY	BTI TELECOM	PLANNED	LUCENT ASCEND	LOUSIVILLE
LA	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	BATON ROUGE
LA	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	BATON ROUGE
LA	XSPEDIUS CORPORATION	1*	N/A	BATON ROUGE
LA	XSPEDIUS CORPORATION	1*	N/A	LAFAYETTE
LA	XSPEDIUS CORPORATION	1*	N/A	LAKE CHARLES
LA	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	NEW ORLEANS
LA	INTERMEDIA COMMUNICATIONS	3*	ASCEND 9000; ASCEND CBX 500	NEW ORLEANS
LA	ITC^DELTACOM	1	ATM	NEW ORLEANS

CLEC Packet Switches				
State	**CLEC**	**Number of Switches**	**Switch Type**	**City**
LA	NEWSOUTH COMMUNICATIONS	1	CISCO BPX 8600 & MGX 8850	NEW ORLEANS
LA	US LEC	1	LUCENT CBX500	NEW ORLEANS
LA	INTERMEDIA COMMUNICATIONS	2*	N/A	SHREVEPORT
LA	XSPEDIUS CORPORATION	1*	N/A	SHREVEPORT
MA	ADELPHIA BUSINESS SOLUTIONS	1	N/A	BOSTON
MA	ALLEGIANCE TELECOM	1	CISCO BPX 8650	BOSTON
MA	ARBROS COMMUNICATIONS	1	LUCENT ACCESS CONCENTRATOR 120	BOSTON
MA	AT&T	2	ATM/FRAME RELAY	BOSTON
MA	CTC COMMUNICATIONS	1	CISCO 8600/8800	BOSTON
MA	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	BOSTON
MA	GLOBAL CROSSING	1	LUCENT ASCEND	BOSTON
MA	INTERMEDIA COMMUNICATIONS	4*	ASCEND 9000/ASCEND CBX500	BOSTON
MA	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	BOSTON
MA	NET2000 COMMUNICATIONS	1	NORTEL 7480	BOSTON
MA	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	BOSTON
MA	CTC COMMUNICATIONS	1	CISCO 8600/8800	BRAINTREE
MA	AT&T	1	N/A	CAMBRIDGE
MA	CTC COMMUNICATIONS	1	CISCO 8600/8800	DANVERS
MA	CTC COMMUNICATIONS	1	CISCO 8600/8800	LEXINGTON
MA	CTC COMMUNICATIONS	1	CISCO 8600/8800	MANCHESTER
MA	AT&T	1	IP	MARLBOROUGH
MA	CTC COMMUNICATIONS	1	CISCO 8600/8800	MARLBORO
MA	CTC COMMUNICATIONS	1	CISCO 8600/8800	NORTH ATTLEBORO
MA	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	SALEM
MA	CHOICE ONE COMMUNICATIONS	1	LUCENT/CISCO	SPRINGFIELD
MA	CTC COMMUNICATIONS	1	CISCO 8600/8800	SPRINGFIELD
MA	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	SPRINGFIELD
MA	CTC COMMUNICATIONS	1	CISCO 8600/8800	WALTHAM
MA	CTC COMMUNICATIONS	1	CISCO 8600/8800	WEST SPRINGFIELD
MA	AT&T	1	N/A	WORCESTER
MA	CHOICE ONE COMMUNICATIONS	1	LUCENT 5ESS	WORCESTER
MA	LIGHTSHIP TELECOM	1	LUCENT CBX500	WORCESTER
MA	BROADVIEW NETWORKS	PLANNED	CISCO ATM	BOSTON
MD	ALLEGIANCE TELECOM	1	CISCO BPX 8650	BALTIMORE
MD	AT&T	2	ATM/FRAME RELAY	BALTIMORE
MD	GLOBAL CROSSING	1	LUCENT ASCEND	BALTIMORE
MD	INTERMEDIA COMMUNICATIONS	2*	ASCEND 9000	BALTIMORE
MD	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	BALTIMORE
MD	NET2000 COMMUNICATIONS	1	NORTEL 7480	BALTIMORE
MD	US LEC	1	LUCENT CBX500	BALTIMORE
MD	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	BALTIMORE
ME	CTC COMMUNICATIONS	1	CISCO 8600/8800	BANGOR
ME	CTC COMMUNICATIONS	1	CISCO 8600/8800	PORTLAND
ME	LIGHTSHIP TELECOM	1	LUCENT CBX500	PORTLAND
ME	MID-MAINE COMMUNICATIONS	1	N/A	PORTLAND
MI	ALLEGIANCE TELECOM	1	CISCO BPX 8650	DETROIT
MI	AT&T	1	N/A	DETROIT
MI	INTERMEDIA COMMUNICATIONS	3*	ASCEND 9000; ASCEND CBX 500	DETROIT
MI	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	DETROIT
MI	CHOICE ONE COMMUNICATIONS	1	CISCO	LANSING

CLEC Packet Switches				
State	**CLEC**	**Number of Switches**	**Switch Type**	**City**
MI	TDS METROCOM	PLANNED	CISCO/PARADYNE	ANN ARBOR
MI	CTS TELECOM D/B/A CLIMAX TELEPHONE CO.	PLANNED	N/A	BATTLE CREEK
MI	FOCAL COMMUNICATIONS	PLANNED	N/A	DETROIT
MN	INTEGRA TELECOM	1	LUCENT	BAXTER
MN	ALLEGIANCE TELECOM	1	CISCO BPX 8650	MINNEAPOLIS
MN	AT&T	1	ATM	MINNEAPOLIS
MN	ESCHELON TELECOM	1	NORTEL PASSPORT ATM	MINNEAPOLIS
MN	GLOBAL CROSSING	1	LUCENT ASCEND	MINNEAPOLIS
MN	INTEGRA TELECOM	1	LUCENT	MINNEAPOLIS
MN	INTERMEDIA COMMUNICATIONS	2	ASCEND 9000; ASCEND CBX 500	MINNEAPOLIS
MN	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	MINNEAPOLIS
MN	WORLDCOM	1	N/A	MINNEAPOLIS
MN	XO COMMUNICATIONS	2*	N/A	MINNEAPOLIS
MN	INTEGRA TELECOM	1	LUCENT	PRIOR LAKE
MN	ESCHELON TELECOM	1	N/A	SAINT PAUL
MN	HICKORYTECH	PLANNED	N/A	NICOLLET
MO	AT&T	1	ERICCSON STP	KANSAS CITY
MO	EVEREST CONNECTIONS	1	N/A	KANSAS CITY
MO	GLOBAL CROSSING	1	LUCENT ASCEND	KANSAS CITY
MO	INTERMEDIA COMMUNICATIONS	3*	ASCEND 9000; ASCEND CBX 500	KANSAS CITY
MO	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	KANSAS CITY
MO	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	KANSAS CITY
MO	ALLEGIANCE TELECOM	1	CISCO BPX 8650	SAINT LOUIS
MO	AT&T	1	ERICCSON STP	SAINT LOUIS
MO	INTERMEDIA COMMUNICATIONS	3*	ASCEND 9000; ASCEND CBX 500	SAINT LOUIS
MO	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	SAINT LOUIS
MO	LOGIX COMMUNICATIONS ENTERPRISES	1	CISCO ATM	SAINT LOUIS
MO	NUVOX COMMUNICATIONS	1	LUCENT AC 120	SAINT LOUIS
MO	WORLDCOM	1	N/A	SAINT LOUIS
MO	GLOBAL CROSSING	1	LUCENT ASCEND	SPRINGFIELD
MO	LOGIX COMMUNICATIONS ENTERPRISES	1	CISCO ATM	SPRINGFIELD
MO	NUVOX COMMUNICATIONS	1	LUCENT AC 120	SPRINGFIELD
MS	ITC^DELTACOM	2	ATM; FRAME RELAY	GULFPORT
MS	AT&T	1	ERICCSON STP	JACKSON
MS	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	JACKSON
MS	INTERMEDIA COMMUNICATIONS	2*	ASCEND 9000	JACKSON
MS	ITC^DELTACOM	1	ASCEND FRAME RELAY	JACKSON
MT	WINSTAR COMMUNICATIONS	1	FRAME RELAY	MISSOULA
NC	AT&T	2	ATM; FRAME RELAY	CHARLOTTE
NC	BTI TELECOM	1	LUCENT ASCEND FRAME RELAY	CHARLOTTE
NC	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	CHARLOTTE
NC	INTERMEDIA COMMUNICATIONS	4*	ASCEND 9000; ASCEND CBX 500	CHARLOTTE
NC	ITC^DELTACOM	1	ATM	CHARLOTTE
NC	NEWSOUTH COMMUNICATIONS	1	CISCO BPX 8600 & MGX 8850	CHARLOTTE
NC	TIME WARNER TELECOM	18*	FORE/ALCATEL/LUCENT/ASCEND	CHARLOTTE
NC	US LEC	1	LUCENT CBX500	CHARLOTTE
NC	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	CHARLOTTE
NC	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	DURHAM
NC	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	FAYETTEVILLE
NC	AT&T	1	ERICCSON STP	GREENSBORO

CLEC Packet Switches				
State	**CLEC**	**Number of Switches**	**Switch Type**	**City**
NC	BTI TELECOM	1	LUCENT ASCEND	GREENSBORO
NC	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	GREENSBORO
NC	ITC^DELTACOM	2	ASCEND FRAME RELAY; ASCEND ATM	GREENSBORO
NC	NEWSOUTH COMMUNICATIONS	1	CISCO BPX 8600 & MGX 8850	GREENSBORO
NC	TIME WARNER TELECOM	2*	FORE/ /LUCENT/ALCATEL	GREENSBORO
NC	US LEC	1	LUCENT CBX500	GREENSBORO
NC	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	GREENVILLE
NC	BTI TELECOM	3	2 LUCENT ASCEND FRAME RELAY; LUCENT ATM	RALEIGH
NC	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	RALEIGH
NC	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	RALEIGH
NC	INTERMEDIA COMMUNICATIONS	3*	ASCEND 9000; ASCEND CBX 500	RALEIGH
NC	TIME WARNER TELECOM	25*	FORE/ALCATEL/LUCENT/ASCEND	RALEIGH
NC	US LEC	1	LUCENT CBX500	RALEIGH
NC	BTI TELECOM	1	LUCENT ASCEND	ROCKY MOUNT
NC	BTI TELECOM	1	LUCENT ASCEND	WILMINGTON
NC	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	WILMINGTON
NC	INTERMEDIA COMMUNICATIONS	1*	N/A	WINSTON-SALEM
NC	NEWSOUTH COMMUNICATIONS	1	CISCO BPX 8600 & MGX 8850	WINSTON-SALEM
NC	BTI TELECOM	PLANNED	LUCENT ATM	CHARLOTTE
NE	AT&T	2	ATM; FRAME RELAY	OMAHA
NH	CTC COMMUNICATIONS	1	CISCO 8600/8800	BEDFORD
NH	CHOICE ONE COMMUNICATIONS	1	LUCENT/CISCO	MANCHESTER
NH	FAIRPOINT COMMUNICATIONS	1	N/A	MANCHESTER
NH	LIGHTSHIP TELECOM	1	LUCENT CBX500	MANCHESTER
NH	BAY RING	1	CONVERGENT ICS2000	PORTSMOUTH
NJ	AT&T	1	ERICCSON STP	FREEHOLD
NJ	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	JERSEY CITY
NJ	AT&T	1	ATM	NEW BRUNSWICK
NJ	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	NEW BRUNSWICK
NJ	ALLEGIANCE TELECOM	1	CISCO BPX 8650	NEWARK
NJ	ARBROS COMMUNICATIONS	1	LUCENT ACCESS CONCENTRATOR 120	NEWARK
NJ	AT&T	2	ATM/FRAME RELAY	NEWARK
NJ	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	NEWARK
NJ	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	NEWARK
NJ	NET2000 COMMUNICATIONS	1	N/A	NEWARK
NJ	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	NEWARK
NJ	ADELPHIA BUSINESS SOLUTIONS	1	ASCEND ATM	PARSIPPANY
NJ	AT&T	1	IP	PISCATAWAY
NM	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	ALBUQUERQUE
NM	PAC-WEST TELECOMM	1*	N/A	ALBUQUERQUE
NM	NTS COMMUNICATIONS	PLANNED	N/A	ALBUQUERQUE
NV	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	LAS VEGAS
NV	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	LAS VEGAS
NV	INTERMEDIA COMMUNICATIONS	2	ASCEND 9000; ASCEND CBX 500	LAS VEGAS
NV	PAC-WEST TELECOMM	1	ALCATEL MEGAHUB 600E	LAS VEGAS
NV	US TELEPACIFIC D/B/A TELEPACIFIC	1	CISCO BPX 8620	LAS VEGAS
NV	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	LAS VEGAS
NV	WESTERN INTEGRATED NETWORKS	PLANNED	N/A	LAS VEGAS
NV	ESCHELON TELECOM	PLANNED	N/A	RENO

CLEC Packet Switches				
State	**CLEC**	**Number of Switches**	**Switch Type**	**City**
NY	CHOICE ONE COMMUNICATIONS	1	LUCENT/CISCO	ALBANY
NY	CTC COMMUNICATIONS	1	CISCO 8600/8800	ALBANY
NY	INTERMEDIA COMMUNICATIONS	2	ASCEND CBX500/ ASCEND 9000	ALBANY
NY	TIME WARNER TELECOM	4*	FORE/ALCATEL/LUCENT/ASCEND	ALBANY
NY	CABLEVISION LIGHTPATH	1*	N/A	BAYVILLE
NY	INTERMEDIA COMMUNICATIONS	1*	N/A	BINGHAMTON
NY	TIME WARNER TELECOM	2*	FORE/LUCENT/ASCEND	BINGHAMTON
NY	CHOICE ONE COMMUNICATIONS	1	LUCENT/CISCO	BUFFALO
NY	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	BUFFALO
NY	INTERMEDIA COMMUNICATIONS	4*	ASCEND 9000/ASCEND CBX 500	BUFFALO
NY	INTERMEDIA COMMUNICATIONS	3*	N/A	COLONIE
NY	CTC COMMUNICATIONS	1	CISCO 8600/8800	ELMSFORD
NY	INTERMEDIA COMMUNICATIONS	2*	N/A	GLENMONT
NY	CABLEVISION LIGHTPATH	1*	N/A	HICKSVILLE
NY	NET2000 COMMUNICATIONS	1*	N/A	LONG ISLAND
NY	CTC COMMUNICATIONS	1	CISCO 8600/8800	MELVILLE
NY	CTC COMMUNICATIONS	1	CISCO 8600/8800	NANUET
NY	ALLEGIANCE TELECOM	2	CISCO BPX 8650	NEW YORK
NY	ARBROS COMMUNICATIONS	1	LUCENT ACCESS CONCENTRATOR	NEW YORK
NY	AT&T	2	ERICCSON STP/NA	NEW YORK
NY	AT&T	1	ATM/FRAME RELAY	NEW YORK
NY	BTI TELECOM	1	LUCENT ASCEND FRAME RELAY	NEW YORK
NY	CTC COMMUNICATIONS	1	CISCO 8600/8800	NEW YORK
NY	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	NEW YORK
NY	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	NEW YORK
NY	GLOBAL CROSSING	1	LUCENT ASCEND	NEW YORK
NY	GLOBALCOM	1	N/A	NEW YORK
NY	INTERMEDIA COMMUNICATIONS	7*	ASCEND 9000/ASCEND CBX 500	NEW YORK
NY	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	NEW YORK
NY	NET2000 COMMUNICATIONS	1	NORTEL 7480	NEW YORK
NY	NETWORK PLUS	1*	N/A	NEW YORK
NY	REACH COMMUNICATIONS	1	N/A	NEW YORK
NY	SPHERA OPTICAL	1*	N/A	NEW YORK
NY	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	NEW YORK
NY	WORLDCOM	1	N/A	NEW YORK
NY	INTERMEDIA COMMUNICATIONS	2*	ASCEND 9000	POUGHKEEPSIE
NY	CHOICE ONE COMMUNICATIONS	1	LUCENT CISCO	ROCHESTER
NY	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	ROCHESTER
NY	GLOBAL CROSSING	1	LUCENT ASCEND	ROCHESTER
NY	INTERMEDIA COMMUNICATIONS	3*	ASCEND 9000; ASCEND CBX 500	ROCHESTER
NY	TIME WARNER TELECOM	9*	FORE/ALCATEL/LUCENT/ASCEND	ROCHESTER
NY	CTC COMMUNICATIONS	1	CISCO 8600/8800	SYOSSET
NY	CHOICE ONE COMMUNICATIONS	1	LUCENT/CISCO	SYRACUSE
NY	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	SYRACUSE
NY	INTERMEDIA COMMUNICATIONS	4*	ASCEND 9000/ASCEND CBX500	SYRACUSE
NY	AT&T	1	ERICCSON STP	WHITE PLAINS
NY	CTC COMMUNICATIONS	1	CISCO 8600/8800	YORKTOWN HEIGHTS
NY	BTI TELECOM	PLANNED	LUCENT ATM	NEW YORK
NY	BROADVIEW NETWORKS	PLANNED	CISCO ATM	NEW YORK
NY	BROADVIEW NETWORKS	PLANNED	CISCO ATM	SYRACUSE
OH	GLOBAL CROSSING	1	LUCENT ASCEND	AKRON

CLEC Packet Switches				
State	**CLEC**	**Number of Switches**	**Switch Type**	**City**
OH	NUVOX COMMUNICATIONS	1	LUCENT AC 120	AKRON
OH	AT&T	1	ATM	CINCINNATI
OH	GLOBAL CROSSING	1	LUCENT ASCEND	CINCINNATI
OH	INTERMEDIA COMMUNICATIONS	3*	ASCEND 9000; ASCEND CBX 500	CINCINNATI
OH	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN 120	CINCINNATI
OH	NUVOX COMMUNICATIONS	1	LUCENT AC 120	CINCINNATI
OH	TIME WARNER TELECOM	10	FORE/ALCATEL/LUCENT/ASCEND	CINCINNATI
OH	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	CINCINNATI
OH	ALLEGIANCE TELECOM	1	CISCO BPX 8650	CLEVELAND
OH	AT&T	1	ERICCSON STP	CLEVELAND
OH	GLOBAL CROSSING	1	LUCENT ASCEND	CLEVELAND
OH	ICG COMMUNICATIONS	1	AIN NODES	CLEVELAND
OH	INTERMEDIA COMMUNICATIONS	2	ASCEND 9000; ASCEND CBX 500	CLEVELAND
OH	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	CLEVELAND
OH	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	CLEVELAND
OH	WORLDCOM	1	N/A	CLEVELAND
OH	AT&T	1	ATM	COLUMBUS
OH	GLOBAL CROSSING	1	LUCENT ASCEND	COLUMBUS
OH	ICG COMMUNICATIONS	1	AIN NODES	COLUMBUS
OH	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	COLUMBUS
OH	TIME WARNER TELECOM	1	FORE	COLUMBUS
OH	WINSTAR COMMUNICATIONS	1	ASCEND 9000 FRAME RELAY	COLUMBUS
OH	ICG COMMUNICATIONS	1	AIN NODES	DAYTON
OH	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	DAYTON
OH	BUCKEYE TELESYSTEM	1	NEWBRIDGE ATM/NEWBRIDGE FRAME RELAY	TOLEDO
OH	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	TOLEDO
OK	AT&T	1	ERICCSON STP	OKLAHOMA CITY
OK	LOGIX COMMUNICATIONS ENTERPRISES	1	CISCO ATM	OKLAHOMA CITY
OK	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	OKLAHOMA CITY
OK	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	TULSA
OK	LOGIX COMMUNICATIONS ENTERPRISES	1	CISCO ATM	TULSA
OK	NUVOX COMMUNICATIONS	1	LUCENT AC 120	TULSA
OK	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	TULSA
OK	NTS COMMUNICATIONS	PLANNED	N/A	OKLAHOMA CITY
OR	INTEGRA TELECOM	1	LUCENT	BEAVERTON
OR	ADVANCED TELCOM GROUP	1	N/A	EUGENE
OR	ALLEGIANCE TELECOM	1	CISCO BPX 8650	PORTLAND
OR	AT&T	1	N/A	PORTLAND
OR	ESCHELON TELECOM	1	NORTEL PASSPORT ATM	PORTLAND
OR	GLOBAL CROSSING	1	LUCENT ASCEND	PORTLAND
OR	INTEGRA TELECOM	1	LUCENT	PORTLAND
OR	INTERMEDIA COMMUNICATIONS	2	ASCEND 9000	PORTLAND
OR	WORLDCOM	1	N/A	PORTLAND
OR	WANTEL	1	CONVERGENT NETWORKS ICS 2000	ROSEBURG
OR	ADVANCED TELCOM GROUP	1	N/A	SALEM
OR	ADVANCED TELCOM GROUP	1	N/A	SPRINGFIELD
OR	WESTERN INTEGRATED NETWORKS	PLANNED	N/A	PORTLAND
PA	CHOICE ONE COMMUNICATIONS	1	LUCENT/CISCO ATM	ALLENTOWN
PA	PENN TELECOM D/B/A PENNTELE.COM	1	N/A	GIBSONIA

CLEC Packet Switches				
State	**CLEC**	**Number of Switches**	**Switch Type**	**City**
PA	ARBROS COMMUNICATIONS	1	LUCENT ACCESS CONCENTRATOR 120	HARRISBURG
PA	CHOICE ONE COMMUNICATIONS	1	LUCENT/CISCO ATM	HARRISBURG
PA	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	HARRISBURG
PA	ALLEGIANCE TELECOM	1	CISCO BPX 8650	PHILADELPHIA
PA	ARBROS COMMUNICATIONS	1	LUCENT ACCESS CONCENTRATOR 120	PHILADELPHIA
PA	AT&T	1	ATM	PHILADELPHIA
PA	BTI TELECOM	1	LUCENT ASCEND	PHILADELPHIA
PA	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	PHILADELPHIA
PA	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	PHILADELPHIA
PA	GLOBAL CROSSING	1	LUCENT ASCEND	PHILADELPHIA
PA	INTERMEDIA COMMUNICATIONS	4*	ASCEND 9000/ ASCEND CBX500	PHILADELPHIA
PA	NET2000 COMMUNICATIONS	1	NORTEL PASSPORT	PHILADELPHIA
PA	US LEC	1	LUCENT 7 R/E PACKET DRIVER, LUCENT CBX500	PHILADELPHIA
PA	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	PHILADELPHIA
PA	WORLDCOM	1	N/A	PHILADELPHIA
PA	ARBROS COMMUNICATIONS	1	LUCENT ACCESS CONCENTRATOR 120	PITTSBURGH
PA	AT&T	1	ATM	PITTSBURGH
PA	CHOICE ONE COMMUNICATIONS	1	LUCENT/CISCO	PITTSBURGH
PA	GLOBAL CROSSING	1	LUCENT ASCEND	PITTSBURGH
PA	INTERMEDIA COMMUNICATIONS	3*	ASCEND 9000/ASCEND CBX500	PITTSBURGH
PA	US LEC	1	LUCENT CBX500	PITTSBURGH
PA	CHOICE ONE COMMUNICATIONS	1	LUCENT/CISCO	SCRANTON/WILKES-BARRE
PA	CEI NETWORKS	1	N/A	STATE COLLEGE
PA	BROADVIEW NETWORKS	PLANNED	CISCO ATM	HORSHAM
RI	AT&T	1	ATM	PROVIDENCE
RI	CHOICE ONE COMMUNICATIONS	1	LUCENT/CISCO	PROVIDENCE
RI	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	PROVIDENCE
RI	NET2000 COMMUNICATIONS	1	NORTEL PASSPORT	PROVIDENCE
SC	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	CHARLESTON
SC	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	CHARLESTON
SC	KNOLOGY BROADBAND	1	FORE ATM	CHARLESTON
SC	NEWSOUTH COMMUNICATIONS	1	CISCO BPX 8600 & MGX 8850	CHARLESTON
SC	US LEC	1	LUCENT CBX500	CHARLESTON
SC	BTI TELECOM	1	LUCENT ASCEND	COLUMBIA
SC	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	COLUMBIA
SC	INTERMEDIA COMMUNICATIONS	2*	ASCEND 9000	COLUMBIA
SC	ITC^DELTACOM	2	CASCADE 9000; ATM	COLUMBIA
SC	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	FLORENCE
SC	BTI TELECOM	1	LUCENT ASCEND	GREENVILLE
SC	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	GREENVILLE
SC	INTERMEDIA COMMUNICATIONS	2*	ASCEND 9000	GREENVILLE
SC	NEWSOUTH COMMUNICATIONS	1	CISCO BPX 8600 & MGX 8850	GREENVILLE
SC	BTI TELECOM	PLANNED*	N/A	CHARLESTON
SC	KNOLOGY BROADBAND	PLANNED*	N/A	CHARLESTON
TN	AT&T	1	ATM	CHATTANOOGA
TN	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	CHATTANOOGA
TN	US LEC	1	LUCENT CBX500	CHATTANOOGA

CLEC Packet Switches				
State	**CLEC**	**Number of Switches**	**Switch Type**	**City**
TN	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	CHATTANOOGA
TN	AT&T	1	ATM	KNOXVILLE
TN	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	KNOXVILLE
TN	INTERMEDIA COMMUNICATIONS	2*	ASCEND 9000	KNOXVILLE
TN	US LEC	1	LUCENT CBX500	KNOXVILLE
TN	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	MEMPHIS
TN	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	MEMPHIS
TN	INTERMEDIA COMMUNICATIONS	2	ASCEND 9000; ASCEND CBX 500	MEMPHIS
TN	NUVOX COMMUNICATIONS	1	N/A	MEMPHIS
TN	TIME WARNER TELECOM	6	FORE/ALCATEL/LUCENT/ASCEND	MEMPHIS
TN	US LEC	1	LUCENT CBX500	MEMPHIS
TN	E.SPIRE COMMUNICATIONS	1*	N/A	NASHVILLE
TN	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	NASHVILLE
TN	INTERMEDIA COMMUNICATIONS	2	ASCEND 9000; ASCEND CBX 500	NASHVILLE
TN	ITC^DELTACOM	1	ASCEND FRAME RELAY	NASHVILLE
TN	NEWSOUTH COMMUNICATIONS	1	CISCO BPX 8600 & MGX 8850	NASHVILLE
TN	NUVOX COMMUNICATIONS	1	LUCENT AC 120	NASHVILLE
TN	US LEC	1	LUCENT CBX500	NASHVILLE
TN	WINSTAR COMMUNICATIONS	1*	N/A	NASHVILLE
TN	BTI TELECOM	PLANNED*	N/A	CHATTANOOGA
TN	BTI TELECOM	PLANNED*	N/A	KNOXVILLE
TN	BTI TELECOM	PLANNED*	N/A	NASHVILLE
TX	NTS COMMUNICATIONS	1	LUCENT AC 120	ABILENE
TX	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	AMARILLO
TX	LOGIX COMMUNICATIONS ENTERPRISES	1	CISCO ATM	AMARILLO
TX	NTS COMMUNICATIONS	1	LUCENT AC 120	AMARILLO
TX	ALLEGIANCE TELECOM	1	CISCO BPX 8650	AUSTIN
TX	ICG COMMUNICATIONS	1	AIN NODES	AUSTIN
TX	INTERMEDIA COMMUNICATIONS	1	ASCEND 9000	AUSTIN
TX	LOGIX COMMUNICATIONS ENTERPRISES	1	CISCO ATM	AUSTIN
TX	TIME WARNER TELECOM	7	FORE/ALCATEL/LUCENT/ASCEND	AUSTIN
TX	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	AUSTIN
TX	WORLDCOM	1	CASCADE 9000 FRAME RELAY	AUSTIN
TX	ALLEGIANCE TELECOM	2	CISCO BPX 8650	DALLAS
TX	AT&T	3	ERICCSON STP; 2 IP	DALLAS
TX	BTI TELECOM	1	LUCENT ASCEND	DALLAS
TX	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	DALLAS
TX	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	DALLAS
TX	GLOBAL CROSSING	1	LUCENT ASCEND	DALLAS
TX	GRANDE COMMUNICATIONS NETWORK	2	ASCEND CBX 500 ATM; B STDX 8/9000 FRAME RELAY	DALLAS
TX	INTERMEDIA COMMUNICATIONS	5*	ASCEND 9000; ASCEND CBX 500	DALLAS
TX	IONEX TELECOMMUNICATIONS	1	SPRING TIDE IP SERVICE SWITCH 5000	DALLAS
TX	ITC^DELTACOM	2	FRAME RELAY; ATM	DALLAS
TX	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	DALLAS
TX	LOGIX COMMUNICATIONS ENTERPRISES	1	CISCO ATM	DALLAS
TX	NET2000 COMMUNICATIONS	1*	N/A	DALLAS
TX	NTS COMMUNICATIONS	1	LUCENT CBX500	DALLAS
TX	TIME WARNER TELECOM	1	FORE	DALLAS
TX	WESTERN INTEGRATED NETWORKS	1	N/A	DALLAS

CLEC Packet Switches				
State	**CLEC**	**Number of Switches**	**Switch Type**	**City**
TX	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	DALLAS
TX	WORLDCOM	2	XYLAN AMT	DALLAS
TX	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	EL PASO
TX	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	FORT WORTH
TX	ALLEGIANCE TELECOM	1	CISCO BPX 8650	HOUSTON
TX	AT&T	2	ATM; FRAME RELAY	HOUSTON
TX	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	HOUSTON
TX	EAGLE COMMUNICATIONS	1	ASCEND MAX TNT	HOUSTON
TX	GLOBAL CROSSING	1	LUCENT ASCEND	HOUSTON
TX	GRANDE COMMUNICATIONS NETWORK	2	ASCEND CBX500 ATM; B STDX 8/9000 FRAME RELAY	HOUSTON
TX	INTERMEDIA COMMUNICATIONS	4*	ASCEND 900; ASCEND CBX 500	HOUSTON
TX	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	HOUSTON
TX	LOGIX COMMUNICATIONS ENTERPRISES	1	CISCO ATM	HOUSTON
TX	TIME WARNER TELECOM	22	FORE/ALCATEL/GDC/LUCENT/ ASCEND	HOUSTON
TX	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	HOUSTON
TX	WORLDCOM	2	CASCADE 9000 FRAME RELAY	HOUSTON
TX	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	IRVING
TX	LOGIX COMMUNICATIONS ENTERPRISES	1	CISCO ATM	LUBBOCK
TX	NTS COMMUNICATIONS	1	LUCENT CBX500	LUBBOCK
TX	NTS COMMUNICATIONS	1	LUCENT AC 120	MIDLAND/ODESA
TX	ALLEGIANCE TELECOM	1	CISCO BPX 8650	SAN ANTONIO
TX	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	SAN ANTONIO
TX	ICG COMMUNICATIONS	1	AIN NODES	SAN ANTONIO
TX	LOGIX COMMUNICATIONS ENTERPRISES	1	CISCO ATM	SAN ANTONIO
TX	TIME WARNER TELECOM	8	FORE/ALCATEL/GDC/LUCENT/ ASCEND	SAN ANTONIO
TX	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	SAN ANTONIO
TX	WORLDCOM	1	CASCADE 9000 FRAME RELAY	SAN ANTONIO
TX	GRANDE COMMUNICATIONS NETWORK	1	B STDX 8/9000 FRAME RELAY	SAN MARCOS
TX	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	SUNNYVALE
TX	NTS COMMUNICATIONS	1	LUCENT AC 120	WICHITA FALLS
TX	WESTERN INTEGRATED NETWORKS	PLANNED	N/A	AUSTIN
TX	FOCAL COMMUNICATIONS	PLANNED	N/A	DALLAS
TX	NTS COMMUNICATIONS	PLANNED	N/A	EL PASO
TX	WESTERN INTEGRATED NETWORKS	PLANNED	N/A	HOUSTON
TX	WESTERN INTEGRATED NETWORKS	PLANNED	N/A	SAN ANTONIO
UT	AT&T	1	ATM	SALT LAKE CITY
UT	ESCHELON TELECOM	1	NORTEL PASSPORT ATM	SALT LAKE CITY
UT	INTEGRA TELECOM	1	LUCENT	SALT LAKE CITY
UT	INTERMEDIA COMMUNICATIONS	2	ASCEND 9000; ASCEND CBX 500	SALT LAKE CITY
UT	PAC-WEST TELECOMM	1*	N/A	SALT LAKE CITY
VA	AT&T	1	ERICCSON STP	ARLINGTON
VA	INTERMEDIA COMMUNICATIONS	1*	N/A	FAIRFAX
VA	NET2000 COMMUNICATIONS	1	NORTEL 7480	HERNDON
VA	ARBROS COMMUNICATIONS	1	LUCENT ACCESS CONCENTRATOR 120	NORFOLK
VA	NET2000 COMMUNICATIONS	1	NORTEL 7480	NORFOLK
VA	US LEC	1	LUCENT CBX500	NORFOLK
VA	ARBROS COMMUNICATIONS	1	LUCENT ACCESS CONCENTRATOR 120	RICHMOND

CLEC Packet Switches				
State	**CLEC**	**Number of Switches**	**Switch Type**	**City**
VA	E.SPIRE COMMUNICATIONS	1	ALCATEL MULTISERVICE	RICHMOND
VA	INTERMEDIA COMMUNICATIONS	2*	ASCEND 9000	RICHMOND
VA	NET2000 COMMUNICATIONS	1	NORTEL 7480	RICHMOND
VA	US LEC	1	LUCENT CBX500	RICHMOND
VA	NTELOS	1	N/A	ROANOKE
VA	INTERMEDIA COMMUNICATIONS	1*	N/A	VIENNA
VA	NTELOS	1	N/A	WAYNESBORO
VA	NET2000 COMMUNICATIONS	1	N/A	WILLIAMSBURG
VA	ARBROS COMMUNICATIONS	PLANNED*	N/A	ALEXANDRIA
VA	NET2000 COMMUNICATIONS	PLANNED	N/A	ALEXANDRIA
VA	BTI TELECOM	PLANNED	LUCENT ASCEND	NORFOLK
VA	BTI TELECOM	PLANNED	LUCENT ASCEND	RICHMOND
VT	CTC COMMUNICATIONS	1	CISCO 8600/8800	BURLINGTON
VT	LIGHTSHIP TELECOM	1	LUCENT CBX500	BURLINGTON
WA	INTEGRA TELECOM	1	LUCENT	KENT
WA	ADVANCED TELCOM GROUP	1	N/A	OLYMPIA
WA	ADVANCED TELCOM GROUP	1	N/A	PUYALLUP
WA	AT&T	1	IP	REDMOND
WA	ALLEGIANCE TELECOM	1	CISCO BPX 8650	SEATTLE
WA	AT&T	2	ATM; FRAME RELAY	SEATTLE
WA	ESCHELON TELECOM	1	NORTEL PASSPORT ATM	SEATTLE
WA	GLOBAL CROSSING	1	LUCENT ASCEND	SEATTLE
WA	INTERMEDIA COMMUNICATIONS	2*	N/A	SEATTLE
WA	LIGHTYEAR COMMUNICATIONS	1	ACCEL AN3220	SEATTLE
WA	PAC-WEST TELECOMM	1	ALCATEL MEGAHUB 600E	SEATTLE
WA	WINSTAR COMMUNICATIONS	3	NEWBRIDGE ATM	SEATTLE
WA	WORLDCOM	1	N/A	SEATTLE
WA	AT&T	1	N/A	SPOKANE
WA	WINSTAR COMMUNICATIONS	1	FRAME RELAY	SPOKANE
WA	ADVANCED TELCOM GROUP	3	N/A	TACOMA
WA	WESTERN INTEGRATED NETWORKS	PLANNED	N/A	SEATTLE
WA	XO COMMUNICATIONS	PLANNED*	N/A	SEATTLE
WI	TDS METROCOM	1	CISCO/PARADYNE	APPLETON
WI	MCLEODUSA	1	N/A	EAU CLAIRE
WI	MCLEODUSA	1	N/A	GREEN BAY
WI	CHOICE ONE COMMUNICATIONS	1	LUCENT CISCO	MADISON
WI	MCLEODUSA	1	N/A	MADISON
WI	TDS METROCOM	1	CISCO/PARADYNE	MADISON
WI	AT&T	1	LUCENT 5ESS	MILWAUKEE
WI	CHOICE ONE COMMUNICATIONS	1	LUCENT CISCO	MILWAUKEE
WI	GLOBAL CROSSING	1	LUCENT ASCEND	MILWAUKEE
WI	MCLEODUSA	1	N/A	MILWAUKEE
WI	TIME WARNER TELECOM	10*	FORE/ALCATEL/LUCENT/ASCEND	MILWAUKEE
WI	WINSTAR COMMUNICATIONS	1	NEWBRIDGE ATM	MILWAUKEE
WI	AT&T	1	N/A	WAUKESHA
WV	NTELOS	1	LUCENT 5ESS DIGITAL	CHARLESTON
WV	STRATUSWAVE COMMUNICATIONS	1	ALCATEL MAINSTREETXPRESS	WHEELING

*New Paradigm Resources Group provides switch type and location for some but not all of these switches.

Sources: NPRG CLEC Report 2002, 15th ed., Chs. 5 & 6; *NPRG CLEC Report 2001, 14th ed.,* Ch. 13; *NPRG CIOC Report 2001*, Ch. 7.

APPENDIX F. WIRELESS SWITCHES

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
AL	BELLSOUTH	DS	ALABAMA CELLULAR SERVICE	BIRMINGHAM	609 35TH ST S
AL	BELLSOUTH	DS	ALABAMA CELLULAR SERVICE	HUNTSVILLE	5520 HOLMES AVE NW
AL	BELLSOUTH	DS	ALABAMA CELLULAR SERVICE	MOBILE	3740 INDUSTRIAL PARK DRIVE
AL	BELLSOUTH	CMC	ALABAMA CELLULAR SERVICE	MONTGOMERY	1024 MONTICELLO PARK
AL	VERIZON	DMH	ALABAMA CELLULAR SERVICE	PELL CITY	1701 1ST AVE S
AL	VERIZON	GT5	ALABAMA CELLULAR SERVICE	SCOTTSBORO	307 W PEACHTREE ST
AL	BELLSOUTH	5E	ALABAMA WIRELESS	BIRMINGHAM	1715 6TH AVE N
AL	BELLSOUTH	CMC	ALABAMA WIRELESS	DECATUR	303 BELTLINE PL SW
AL	BELLSOUTH	DMH	ALLTEL	BIRMINGHAM	1920 OXMOOR RD
AL	VERIZON	CMC	ALLTEL	DOTHAN	1530 MONTGOMERY HWY
AL	BELLSOUTH	5EH	ALLTEL	MONTGOMERY	6925 HALCYON DR
AL	VERIZON	CMC	CELLULAR PARTNERS OF LAMAR	ENTERPRISE	621 BOLL WEEVIL RD
AL	BELLSOUTH	CMC	CELLULAR PARTNERS OF LAMAR	SELMA	JCT OF S.R. 219 & S.R.14
AL	BELLSOUTH	CMC	CORR WIRELESS COMMUNICATIONS	HUNTSVILLE	8600 S MEMORIAL PKY
AL	BELLSOUTH	CMC	DIG1PH PCS	MOBILE	103 DAUPHIN ST
AL	BELLSOUTH	CMC	DIG1PH PCS	MOBILE	68 ST FRANCIS ST
AL	VERIZON	CMC	FARMERS CELLULAR TELEPHONE	SECTION	5305 TAMMY LITTLE DR
AL	BELLSOUTH	CMC	NEXTEL	ANNISTON	660 AARONS WAY
AL	BELLSOUTH	CMC	NEXTEL	ATHENS	105 STEWART DR
AL	BELLSOUTH	CMC	NEXTEL	AUBURN	490 N DEAN RD
AL	BELLSOUTH	DMH	NEXTEL	BIRMINGHAM	600 NORTH 18TH ST
AL	BELLSOUTH	CMC	NEXTEL	CLANTON	2159 GILLESPIE ST
AL	BELLSOUTH	CMC	NEXTEL	DECATUR	3817 MARSHA AVE
AL	BELLSOUTH	CMC	NEXTEL	GADSDEN	276 HILLVIEW RD
AL	BELLSOUTH	CMC	NEXTEL	NORTHPORT	9708 HIGHWAY 43 N
AL	BELLSOUTH	CMC	NEXTEL	OPELIKA	1051 DOUGLAS ST
AL	BELLSOUTH	VCD	PINE BELT CELLULAR	SELMA	1207 SELMA AVE
AL	VERIZON	DS	PORTA-PHONE DIV OF JOHN H. PHIPPS	DOTHAN	2312 MONTGOMERY HWY
AL	BELLSOUTH	CMC	SOUTHERN COMMUNICATIONS SERVICES	ANNISTON	410 W 10TH ST
AL	BELLSOUTH	CMC	SOUTHERN COMMUNICATIONS SERVICES	BIRMINGHAM	600 18TH ST N
AL	VERIZON	CMC	SOUTHERN COMMUNICATIONS SERVICES	DOTHAN	2304 INDUSTRIAL RD
AL	BELLSOUTH	CMC	SOUTHERN COMMUNICATIONS SERVICES	GADSDEN	749 FORREST AVE
AL	BELLSOUTH	D10	SOUTHERN COMMUNICATIONS SERVICES	HUNTSVILLE	8600 S MEMORIAL PKY
AL	BELLSOUTH	CMC	SOUTHERN COMMUNICATIONS SERVICES	MOBILE	103 DAUPHIN ST
AL	BELLSOUTH	CMC	SOUTHERN COMMUNICATIONS SERVICES	MOBILE	25 BATTLESHIP PKY
AL	BELLSOUTH	ZZZ	SOUTHERN COMMUNICATIONS SERVICES	MONTGOMERY	204 E JEFFERSON ST
AL	BELLSOUTH	CMC	SOUTHERN COMMUNICATIONS SERVICES	TUSCALOOSA	2200 4TH ST
AL	VERIZON	DMS	SPRINT PCS	BIRMINGHAM	156 OXMOOR CT
AL	BELLSOUTH	MTX	SPRINT PCS	BIRMINGHAM	156 OXMOOR CT
AL	BELLSOUTH	DMS	TELEPAK	MOBILE	105 N BELTLINE HWY
AL	BELLSOUTH	CMS	TRITEL COMMUNICATIONS	BIRMINGHAM	432 INDUSTRIAL LN
AL	BELLSOUTH	CMC	TRITEL COMMUNICATIONS	HUNTSVILLE	310 FOUNTAIN CIR SW
AL	BELLSOUTH	CMC	TRITEL COMMUNICATIONS	MOBILE	101 N FRANKLIN ST
AL	BELLSOUTH	CMC	TRITEL COMMUNICATIONS	MONTGOMERY	38 WASHINGTON AVE
AL	BELLSOUTH	CMC	TRITEL COMMUNICATIONS	MONTGOMERY	25 ADAMS AVE
AL	BELLSOUTH	AXT	VOICESTREAM	ANNISTON	410 W 10TH ST
AL	BELLSOUTH	AXT	VOICESTREAM	BIRMINGHAM	950 22ND ST N
AL	BELLSOUTH	AXT	VOICESTREAM	GADSDEN	749 FORREST AVE
AL	BELLSOUTH	AXT	VOICESTREAM	HUNTSVILLE	8600 S MEMORIAL PKY

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
AL	BELLSOUTH	AXT	VOICESTREAM	MONTGOMERY	204 E JEFFERSON ST
AL	BELLSOUTH	5E	VOICESTREAM	OPELIKA	1015 WEST POINT PKY
AR	VERIZON	CMC	ALLTEL	CLARKSVILLE	BIG DANGER ROAD & CLARKSVILLE
AR	SBC	D12	TELETOUCH COMMUNICATIONS	FAYETTEVILLE	138 N EAST AV
AR	SBC	DMH	TELETOUCH COMMUNICATIONS	FORT SMITH	101 N 13TH
AR	SBC	5EH	TELETOUCH COMMUNICATIONS	HOT SPRINGS	220 PROSPECT
AR	SBC	5EH	TELETOUCH COMMUNICATIONS	ROGERS	700 W WALNUT
AZ	QWEST	CMC	AT&T WIRELESS	PHOENIX	211 W MONROE ST
AZ	QWEST	CMC	AT&T WIRELESS	PHOENIX	211 W MONROE ST
AZ	QWEST	5EC	LEAP WIRELESS INTL	PHOENIX	4050 E COTTON CENTER BLVD
AZ	QWEST	5EC	LEAP WIRELESS INTL	TUCSON	4175 S FREMONT AVE
AZ	QWEST	CMC	NETWORK SERVICES	TUCSON	4555 S PALO VERDE RD
AZ	QWEST	5ES	SPRINT PCS	PHOENIX	736 E WATKINS ST
AZ	QWEST	5ES	SPRINT PCS	PHOENIX	736 E WATKINS ST
AZ	QWEST	CMC	SPRINT PCS	PHOENIX	1710 E GRANT ST
AZ	QWEST	CMC	SPRINT PCS	PHOENIX	736 E WATKINS ST
AZ	QWEST	CMC	TRIAD CELLULAR	PAGE	812 AQUA AVE
AZ	QWEST	CMC	WESTERN WIRELESS	YUMA	1289 S 2ND AVE
CA	VERIZON	5E	ALPINE PCS	SAN LUIS OBISPO	3220 S HIGUERA ST
CA	VERIZON	AXT	AT&T WIRELESS	ANAHEIM	301 N CRESCENT WAY
CA	VERIZON	AXT	AT&T WIRELESS	ANAHEIM	301 N CRESCENT WAY
CA	VERIZON	AXT	AT&T WIRELESS	CITY OF COMMERCE	6045 E SLAUSON ST
CA	VERIZON	AXT	AT&T WIRELESS	CITY OF COMMERCE	6045 E SLAUSON ST
CA	VERIZON	CMC	AT&T WIRELESS	CITY OF COMMERCE	6045 E SLAUSON ST
CA	VERIZON	CMC	AT&T WIRELESS	CITY OF COMMERCE	6045 E SLAUSON ST
CA	VERIZON	CMC	AT&T WIRELESS	FRESNO	1445 VAN NESS AVE
CA	VERIZON	AXT	AT&T WIRELESS	GARDENA	15215 S BROADWAY *
CA	VERIZON	AXT	AT&T WIRELESS	GARDENA	15215 S BROADWAY *
CA	VERIZON	CMC	AT&T WIRELESS	GOLETA	6485 CALLE REAL
CA	VERIZON	CMC	AT&T WIRELESS	LAGUNA HILLS	31 COLUMBIA
CA	VERIZON	AXT	AT&T WIRELESS	RIVERSIDE	4135 GARNER RD
CA	VERIZON	AXT	AT&T WIRELESS	RIVERSIDE	4135 GARNER RD
CA	VERIZON	CMC	AT&T WIRELESS	SAN BERNARDINO	455 2ND ST
CA	VERIZON	CMC	AT&T WIRELESS	SANTA BARBARA	819 CHAPALA ST
CA	VERIZON	CMC	AT&T WIRELESS	STOCKTON	6855 W EIGHT MILE RD FLOOR 1
CA	VERIZON	DM2	BAY AREA CELLULAR TELEPHONE	SANTA CLARA	1700 SPACE PARK DR
CA	SBC	DM2	DIGITCOM SERVICES	ALHAMBRA	21 S 1ST ST
CA	SBC	DMH	DIGITCOM SERVICES	COMPTON	608 E COMPTON BLVD
CA	SBC	DMH	DIGITCOM SERVICES	CULVER CITY	3847 CARDIFF AV
CA	SBC	DMH	DIGITCOM SERVICES	LOS ANGELES	720 S RAMPART BLVD
CA	VERIZON	DMH	DIGITCOM SERVICES	PALMDALE	901 E PALMDALE BL
CA	SBC	5E	DIGITCOM SERVICES	PARAMOUNT	15706 S PARAMNT BL
CA	VERIZON	4E	NETWORK SERVICES	ANAHEIM	217 N LEMON ST
CA	VERIZON	D12	NETWORK SERVICES	BAKERSFIELD	148 WEEDPATCH HWY
CA	SBC	5E	NETWORK SERVICES	BAKERSFIELD	1918 M ST
CA	VERIZON	DM2	NETWORK SERVICES	FRESNO	1455 VAN NESS AV
CA	SBC	5EH	NETWORK SERVICES	MODESTO	1025-13TH ST
CA	SBC	5EH	NETWORK SERVICES	ONTARIO	211 W D ST
CA	VERIZON	DM2	NETWORK SERVICES	SACRAMENTO	1407-11-23 J ST
CA	VERIZON	4E	NETWORK SERVICES	SAN FRANCISCO	611 FOLSOM ST
CA	VERIZON	4E	NETWORK SERVICES	SANTA CLARA	1700 SPACE PARK DR

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
CA	SBC	DMH	NETWORK SERVICES	STOCKTON	345 N SAN JOAQUIN
CA	SBC	5E	NETWORK SERVICES	TURLOCK	325 N CENTER ST
CA	SBC	DM2	NEXTEL	ANAHEIM	217 N LEMON ST
CA	SBC	DM2	NEXTEL	CHICO	518 W 4TH ST
CA	SBC	D12	NEXTEL	LOS ANGELES	624 S GRAND *
CA	SBC	DM2	NEXTEL	LOS ANGELES	420 S GRAND AV
CA	SBC	4E	NEXTEL	OAKLAND	1587 FRANKLIN ST
CA	SBC	DM2	NEXTEL	OAKLAND	1587 FRANKLIN ST
CA	SBC	DM2	NEXTEL	SALINAS	340 PAJARO ST
CA	SBC	4E	NEXTEL	SAN DIEGO	650 ROBINSON AV
CA	SBC	DM2	NEXTEL	SAN DIEGO	650 ROBINSON AV
CA	SBC	DM2	NEXTEL	SAN LUIS OBISPO	872 MORRO ST
CA	VERIZON	DM2	NEXTEL	STOCKTON	345 N SAN JOAQUIN
CA	SBC	GT5	NEXTEL	THOUSAND OAKS	1204 E THOUSAND OAKS BLVD
CA	VERIZON	5E	SPRINT PCS	BURBANK	3099 N CALIFORNIA ST
CA	VERIZON	5E	SPRINT PCS	BURBANK	3099 N CALIFORNIA ST
CA	VERIZON	5E	SPRINT PCS	IRVINE	2592 DUPONT DR
CA	VERIZON	5E	SPRINT PCS	IRVINE	2592 DUPONT DR
CA	VERIZON	5E	SPRINT PCS	ONTARIO	1643 S GROVE AVE
CA	VERIZON	5E	SPRINT PCS	ONTARIO	1643 S GROVE AVE
CA	VERIZON	5EC	SPRINT PCS	SANTA FE SPRINGS	12103 BURKE ST
CA	VERIZON	4E	THE TELEPHONE CONNECTION OF LOS ANGELES	GARDENA	17200 S VERMONT AV
CA	VERIZON	4E	THE TELEPHONE CONNECTION OF LOS ANGELES	LOS ANGELES	420 S GRAND AV
CA	VERIZON	DM2	THE TELEPHONE CONNECTION OF LOS ANGELES	RIVERSIDE	3580 ORANGE ST 2ND. FLOOR
CA	VERIZON	4E	THE TELEPHONE CONNECTION OF LOS ANGELES	SHERMAN OAKS	14800 VENTURA BLVD
CA	VERIZON	DM2	US CELLULAR	SANTA ROSA	516 THIRD ST
CA	VERIZON	D12	WESTERN WIRELESS	VICTORVILLE	16461 MOJAVE DR
CO	QWEST	CMC	AT&T WIRELESS	FORT COLLINS	315 W OAK ST
CO	QWEST	CMC	AT&T WIRELESS	FORT LUPTON	16499 WELD COUNTY RD #18
CO	QWEST	CMC	AT&T WIRELESS	GREELEY	3115 35TH AVE
CO	QWEST	5EC	GLENN ISHIHARA	JUNCTION	1600 UTE AVE GRAND
CO	QWEST	CMC	WESTERN WIRELESS	PUEBLO	1111 BONFORTE BLVD
CT	SBC	5E	GEOTEK COMMUNICATIONS	NORWALK	2 WASHINGTON ST
CT	SBC	5EH	NEXTEL	BRIDGEPORT	365 JOHN ST
CT	SBC	5E	NEXTEL	DANBURY	39 WEST ST
CT	SBC	D12	NEXTEL	HARTFORD	111 TRUMBULL ST
CT	SBC	DE5	NEXTEL	MERIDEN	27 BUTLER ST
CT	SBC	5EH	NEXTEL	NEW HAVEN	310 ORANGE ST
CT	SBC	5EH	NEXTEL	NEW LONDON	26 WASHINGTON ST
CT	SBC	5E	NEXTEL	NORWALK	2 WASHINGTON ST
CT	SBC	5E	NEXTEL	SOUTHINGTON	142 MAIN ST
CT	SBC	5E	NEXTEL	STAMFORD	555 MAIN ST
CT	SBC	5E	NEXTEL	WATERBURY	348 GRAND ST
CT	SBC	DMH	VOICESTREAM	BLOOMFIELD	100 FILLEY ST
DC	VERIZON	CMC	AT&T WIRELESS	WASHINGTON	725 13TH ST NW
DC	VERIZON	CMC	AT&T WIRELESS	WASHINGTON	725 13TH ST NW
DE	VERIZON	CMC	NEXTEL	WILMINGTON	919 N. MARKET ST., WILMINGTON
FL	BELLSOUTH	CMC	ALLTEL	CHIPLEY	GILBERT MILL RD

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
FL	BELLSOUTH	CMC	ALLTEL	GAINESVILLE	400 SW 2ND AVE
FL	BELLSOUTH	5EH	ALLTEL	JACKSONVILLE	661 RIVERSIDE AVE
FL	BELLSOUTH	5EH	ALLTEL	JACKSONVILLE	661 RIVERSIDE AVE
FL	BELLSOUTH	CMC	ALLTEL	LAKE CITY	5 OSTEEN RD
FL	BELLSOUTH	DS	ALLTEL	NORTH GAINESVILLE	7525 NW 4TH BLVD
FL	BELLSOUTH	DS	ALLTEL	PENSACOLA	2620 W GADSDEN ST
FL	BELLSOUTH	DS	ALLTEL	YOUNGSTOWN (BAY COUNTY)	12502 HWY 20
FL	BELLSOUTH	CMC	ARCH WIRELESS HOLDINGS	HOLLY HILL	158 RIDGEWOOD AVE
FL	BELLSOUTH	CMC	ARCH WIRELESS HOLDINGS	ORLANDO	3915 E COLONIAL DR
FL	BELLSOUTH	CMC	AT&T WIRELESS	BROOKSVILLE	17709 US 41
FL	BELLSOUTH	CMC	AT&T WIRELESS	COCOA	712 FLORIDA AVE
FL	BELLSOUTH	AXT	AT&T WIRELESS	DAYTONA BEACH	268 N RIDGEWOOD AVE
FL	BELLSOUTH	DS	AT&T WIRELESS	DAYTONA BEACH	1133 THIRD ST
FL	BELLSOUTH	AXT	AT&T WIRELESS	JACKSONVILLE	424 N PEARL ST
FL	BELLSOUTH	AXT	AT&T WIRELESS	OJUS	460 NE 215TH ST
FL	BELLSOUTH	AXT	AT&T WIRELESS	OJUS	460 NE 215TH ST
FL	BELLSOUTH	DS	AT&T WIRELESS	ORLANDO	45 N MAGNOLIA AVE
FL	BELLSOUTH	CMC	AT&T WIRELESS	PENSACOLA	30 W BELMONT ST
FL	VERIZON	CMC	AT&T WIRELESS	POLK CITY	16182 COMMONWEALTH AVE N
FL	VERIZON	CMC	AT&T WIRELESS	POLK CITY	17924 STHWY 33
FL	VERIZON	CMC	AT&T WIRELESS	POLK CITY	16182 COMMONWEALTH AVE N
FL	VERIZON	CMC	AT&T WIRELESS	TAMPA	501 E KENNEDY BLVD
FL	BELLSOUTH	CMC	AT&T WIRELESS	WEST PALM BEACH	325 GARDENIA ST
FL	BELLSOUTH	CMC	AT&T WIRELESS	WEST PALM BEACH	325 GARDENIA ST 9TH FLOOR
FL	BELLSOUTH	CMC	DIG1PH PCS	PENSACOLA	490 W WINTROP
FL	BELLSOUTH	DS	FLORIDA CELLULAR SERVICE	FORT LAUDERDALE	1841 NW 22ND ST
FL	BELLSOUTH	DS	FLORIDA CELLULAR SERVICE	FT LAUDERDALE	1841 NW 22ND ST
FL	BELLSOUTH	5E	FLORIDA CELLULAR SERVICE	LAKE WORTH	7600 S MILITARY TRL
FL	BELLSOUTH	5E	FLORIDA CELLULAR SERVICE	LAKE WORTH	7600 S MILITARY TRL
FL	BELLSOUTH	DS	FLORIDA CELLULAR SERVICE	MIAMI	799 NW 81ST ST
FL	BELLSOUTH	DS	FLORIDA CELLULAR SERVICE	PERRINE	12224 SW 114TH PL
FL	BELLSOUTH	G3	GABRIEL WIRELESS	BOCA RATON	6971 N FEDERAL HIGHWAY #206
FL	BELLSOUTH	DS	GEOTEK COMMUNICATIONS	DAYTONA BEACH	900 N INDIAN LAKE RD & US 92 LODE STAR TOWER
FL	BELLSOUTH	DS	GEOTEK COMMUNICATIONS	FT LAUDERDALE	110 SE 6TH ST
FL	BELLSOUTH	DS	GEOTEK COMMUNICATIONS	JACKSONVILLE	532 RIVERSIDE AVE
FL	BELLSOUTH	DS	GEOTEK COMMUNICATIONS	LAKE PARK	1115 OLD DIXIE HWY
FL	BELLSOUTH	DS	GEOTEK COMMUNICATIONS	MIAMI	ONE BISCAYNE TOWER, 2 SOUTH BISCAYNE, 29TH FLR.
FL	BELLSOUTH	DS	GEOTEK COMMUNICATIONS	ORLANDO	200 S ORANGE AVE
FL	BELLSOUTH	DS	JACKSONVILLE MSA LIMITED PARTNERSHIP	JACKSONVILLE	5120 STEPP AVE
FL	BELLSOUTH	DS	JACKSONVILLE MSA LIMITED PARTNERSHIP	JACKSONVILLE	5120 STEPP AVE
FL	BELLSOUTH	5E	METRO PCS	SUNRISE	1401 HARRISON PKY
FL	BELLSOUTH	CMC	METROCALL	GAINESVILLE	414 SW 3RD AVE
FL	BELLSOUTH	CMC	NETWORK SERVICES	ALTAMONTE SPRINGS	283 N NORTH LAKE BLVD, SUITE 201
FL	BELLSOUTH	CMC	NETWORK SERVICES	FORT LAUDERDALE	4901 NW 17TH WAY
FL	BELLSOUTH	CMC	NETWORK SERVICES	GAINESVILLE	400 SW 2ND AVE
FL	BELLSOUTH	CMC	NETWORK SERVICES	JACKSONVILLE	3728 PHILLIPS HWY
FL	BELLSOUTH	DMS	NEXTEL	BROOKSVILLE	509 E SUMMIT RD

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
FL	BELLSOUTH	CMC	NEXTEL	GAINESVILLE	1001 NE WALDO RD
FL	BELLSOUTH	5E	NEXTEL	JACKSONVILLE	10800 W BEAVER ST
FL	BELLSOUTH	CMC	NEXTEL	JACKSONVILLE	424 N PEARL ST
FL	BELLSOUTH	CMC	NEXTEL	JACKSONVILLE	421 W CHURCH ST
FL	BELLSOUTH	CMC	NEXTEL	LAKE CITY	130 W NASSAU ST
FL	BELLSOUTH	CMC	NEXTEL	LAKE MARY (JANE)	1150 EMMA OAKS TRL
FL	BELLSOUTH	CMC	NEXTEL	NORTH DADE	18400 NE 5TH AVE
FL	BELLSOUTH	DMH	NEXTEL	PALM COAST	29 UTILITY DR
FL	VERIZON	CMC	NEXTEL	SARASOTA	.5 MI S/O FRUITVILLE RD ON SHANNON RD
FL	VERIZON	CMC	NEXTEL	TAMPA	110 N MORGAN ST
FL	BELLSOUTH	CMC	NEXTEL	WEST PALM BEACH	3700 RCA BLVD
FL	VERIZON	DMS	NEXTEL	WINTER HAVEN	200 AVE B
FL	BELLSOUTH	CMC	ORLANDO SMSA	GAINESVILLE	400 SW 2ND AVE
FL	BELLSOUTH	CMC	ORLANDO SMSA	LAKE MARY	500 TECHNOLOGY PARK
FL	BELLSOUTH	DS	ORLANDO SMSA	LAKE MARY	500 TECHNOLOGY PARK
FL	BELLSOUTH	DS	ORLANDO SMSA	LAKE MARY	500 TECHNOLOGY PARK
FL	BELLSOUTH	CMC	ORLANDO SMSA	PANAMA CITY	111 E 5TH ST
FL	BELLSOUTH	CMC	ORLANDO SMSA	PORT ORANGE	4750 CITY CENTER PKWY
FL	BELLSOUTH	CMC	PAGING SOURCE USA	DELRAY BEACH	1585 S CONGRESS AVE
FL	BELLSOUTH	CMC	SOUTHERN COMMUNICATIONS SERVICES	PANAMA CITY	1795 INDUSTRIAL DR
FL	BELLSOUTH	CMC	SOUTHERN COMMUNICATIONS SERVICES	PENSACOLA	1490 E NINE MILE RD
FL	BELLSOUTH	CMC	SPRINT PCS	DEERFIELD BEACH	734 S MILITARY TRL
FL	BELLSOUTH	DMS	SPRINT PCS	DEERFIELD BEACH	734 S MILITARY TRL
FL	BELLSOUTH	DMS	SPRINT PCS	JACKSONVILLE	12735 W GRAN BAY PKY
FL	BELLSOUTH	DMS	SPRINT PCS	MIAMI	1050 NW 167TH ST
FL	BELLSOUTH	DMS	SPRINT PCS	MIAMI	1050 NW 167TH ST
FL	BELLSOUTH	5E	SPRINT PCS	ORLANDO	360 S LAKE DESTINY DR
FL	BELLSOUTH	CMC	SPRINT PCS	ORLANDO	360 S LAKE DESTINY DR
FL	VERIZON	DMS	SPRINT PCS	TAMPA	7920 WOODLAND CENTER BLVD
FL	BELLSOUTH	CMC	SPRINT PCS	WEST PALM BEACH	224 DATURA ST
FL	BELLSOUTH	CMC	US CELLULAR	CHIPLEY	952 ALICIA LN
FL	BELLSOUTH	CMC	US CELLULAR	LAKE CITY	1418 BRANFORD RD
FL	BELLSOUTH	DS	US CELLULAR	NORTH GAINESVILLE	2430 NW 73RD PL
FL	BELLSOUTH	CMC	US CELLULAR	PALATKA	162 CHERRY TRL
FL	BELLSOUTH	CMC	US CELLULAR	STUART	4100 SW 48TH AVE
FL	BELLSOUTH	AXT	VOICESTREAM	GAINESVILLE	902 S MAIN ST
FL	BELLSOUTH	CMC	VOICESTREAM	HALLANDALE	600 ANSIN BLVD
FL	BELLSOUTH	AXT	VOICESTREAM	JACKSONVILLE	550 WATER ST
FL	BELLSOUTH	AXT	VOICESTREAM	LYNN HAVEN	810 OHIO AVE
FL	BELLSOUTH	CMC	VOICESTREAM	NORTH DADE	18400 NE 5TH AVE
FL	BELLSOUTH	CMC	VOICESTREAM	OCALA	319 E BROADWAY ST
FL	BELLSOUTH	DX2	VOICESTREAM	ORLANDO	200 TELECOM DR
FL	VERIZON	DX2	VOICESTREAM	TAMPA	6902 CYPRESS PARK DR
FL	BELLSOUTH	CMC	VOICESTREAM	HALLANDALE	600 ANSIN BLVD
GA	BELLSOUTH	DMS	ALLTEL	AUGUSTA	1490 ELLIS ST
GA	BELLSOUTH	CMC	ALLTEL	SAVANNAH	7001 CHATHAM CENTER
GA	BELLSOUTH	CMC	ALLTEL	WAYCROSS	675 S ANITA ST
GA	BELLSOUTH	CMC	ARCH WIRELESS HOLDINGS	BRUNSWICK	1322 BAY ST
GA	BELLSOUTH	CMC	ARCH WIRELESS HOLDINGS	TUCKER	2200 NORTHLAKE PKY
GA	BELLSOUTH	CMC	AT&T WIRELESS	ATLANTA	51 PEACHTREE CENTER AVE NE
GA	BELLSOUTH	CMC	AT&T WIRELESS	ATLANTA	51 PEACHTREE CENTER AVE NE

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
GA	BELLSOUTH	DS	AT&T WIRELESS	ATLANTA	51 PEACHTREE CENTER AVE
GA	BELLSOUTH	DS	AT&T WIRELESS	NORCROSS	5856 BUFORD HWY
GA	BELLSOUTH	DS	ATLANTA - ATHENS MSA LIMITED PARTNERSHIP	ALBANY	304 PINE AVE
GA	BELLSOUTH	DS	ATLANTA - ATHENS MSA LIMITED PARTNERSHIP	ATLANTA	2366 OLD MARIETTA RD
GA	BELLSOUTH	DS	ATLANTA - ATHENS MSA LIMITED PARTNERSHIP	ATLANTA	2366 MARIETTA RD
GA	BELLSOUTH	DS	ATLANTA - ATHENS MSA LIMITED PARTNERSHIP	DECATUR	1085 KATIE KERR DR
GA	BELLSOUTH	DS	ATLANTA - ATHENS MSA LIMITED PARTNERSHIP	DECATUR	1085 KATIE KERR DR
GA	BELLSOUTH	CMC	ATLANTA - ATHENS MSA LIMITED PARTNERSHIP	LA GRANGE	2271 GREENVILLE ROAD
GA	BELLSOUTH	5E	ATLANTA - ATHENS MSA LIMITED PARTNERSHIP	MACON	4306 SHERATON DR
GA	BELLSOUTH	DS	ATLANTA - ATHENS MSA LIMITED PARTNERSHIP	NORCROSS	2850 HUMPHRIES WAY
GA	BELLSOUTH	DS	ATLANTA - ATHENS MSA LIMITED PARTNERSHIP	NORCROSS	2850 HUMPHRIES WAY
GA	BELLSOUTH	DS	ATLANTA - ATHENS MSA LIMITED PARTNERSHIP	NORCROSS	2850 HUMPHRIES WAY
GA	BELLSOUTH	DS	ATLANTA - ATHENS MSA LIMITED PARTNERSHIP	NORCROSS	2850 HUMPHRIES WAY NW
GA	BELLSOUTH	CMC	ATLANTA - ATHENS MSA LIMITED PARTNERSHIP	ROYSTON	143 OAK ST
GA	BELLSOUTH	DSC	ATLANTA - ATHENS MSA LIMITED PARTNERSHIP	TIFTON	116 S VICTORY DR
GA	BELLSOUTH	CMC	ATLANTA - ATHENS MSA LIMITED PARTNERSHIP	WAYCROSS	315 PLANT AVE
GA	BELLSOUTH	5EC	DOBSON CELLULAR SYSTEMS	DALTON	92 ABUTMENT RD
GA	BELLSOUTH	CMC	ENTERPRISE COMMUNICATIONS PARTNERSHIP	ALBANY	2151 GILLIONVILLE RD
GA	BELLSOUTH	CMC	GEORGIA INDEPENDENT PCS CORPORATION	MACON	4890 RALEY RD
GA	BELLSOUTH	VCD	GEORGIA INDEPENDENT PCS CORPORATION	MACON	4890 RALEY RD
GA	BELLSOUTH	CMC	HARGRAY WIRELESS	SAVANNAH	1315 BULL ST
GA	BELLSOUTH	5EC	LEAP WIRELESS INTL	COLUMBUS	1124 13TH ST
GA	BELLSOUTH	5EC	METRO PCS	NORCROSS	2990 GATEWAY DR., STE.950
GA	BELLSOUTH	CMC	METROCALL	ATLANTA	55 MARIETTA ST NW
GA	BELLSOUTH	CMC	METROCALL	AUGUSTA	3351 WRIGHTSBORO RD @ (BLDG-200)
GA	BELLSOUTH	DS	METROCALL	REMERTON	1707 AL BROOKS DR
GA	BELLSOUTH	CMC	NEXTEL	ATHENS	1777 W BROAD ST
GA	BELLSOUTH	D10	NEXTEL	ATLANTA	400 EMBASSY ROW
GA	BELLSOUTH	DMH	NEXTEL	ATLANTA	400 EMBASSY ROW
GA	BELLSOUTH	CMC	NEXTEL	COLUMBUS	1412 10TH AVE
GA	BELLSOUTH	CMC	NEXTEL	CORDELE	260 FLOYD RD
GA	BELLSOUTH	CMC	NEXTEL	DUBLIN	1114 N FRANKLIN ST
GA	BELLSOUTH	CMC	NEXTEL	HOGANSVILLE	177 E HOPSON RD
GA	BELLSOUTH	CMC	NEXTEL	MACON	4792 RALEY RD
GA	BELLSOUTH	CMC	NEXTEL	NORCROSS	5952 PEACHTREE INDUSTRIAL BLVD
GA	BELLSOUTH	CMC	NEXTEL	NORCROSS	4150 SHACKLEFORD RD NW
GA	BELLSOUTH	CMC	NEXTEL	SAVANNAH	1300 BULL ST

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
GA	BELLSOUTH	CMC	NEXTEL	SYLVESTER	302 HARDY ST
GA	BELLSOUTH	CMC	NEXTEL	THOMASVILLE	1325 W JACKSON ST
GA	BELLSOUTH	CMC	NEXTEL	VALDOSTA	1000 CYPRESS ST
GA	BELLSOUTH	CM1	PUBLIC SERVICE CELLULAR	AMERICUS	220 ED CARSON RD
GA	BELLSOUTH	DS	PUBLIC SERVICE CELLULAR	COLUMBUS	418 14TH ST
GA	BELLSOUTH	5E	PUBLIC SERVICE CELLULAR	UNIONVILLE	392 PANSY AVE
GA	BELLSOUTH	CMC	SOUTHERN COMMUNICATIONS SERVICES	ATLANTA	55 PARK PL NE
GA	BELLSOUTH	DS	SOUTHERN COMMUNICATIONS SERVICES	ATLANTA	55 PARK PL NE
GA	BELLSOUTH	CMC	SOUTHERN COMMUNICATIONS SERVICES	AUGUSTA	301 15TH ST
GA	BELLSOUTH	CMC	SOUTHERN COMMUNICATIONS SERVICES	COLUMBUS	424 14TH ST
GA	BELLSOUTH	DMH	SOUTHERN COMMUNICATIONS SERVICES	GAINESVILLE	340 JESSE JEWELL PARKWAY
GA	BELLSOUTH	DMH	SOUTHERN COMMUNICATIONS SERVICES	MACON	185 STATE ST
GA	BELLSOUTH	CMC	SOUTHERN COMMUNICATIONS SERVICES	SAVANNAH	1400 MITCHELL ST
GA	BELLSOUTH	DMS	SPRINT PCS	NORCROSS	5775 REPS MILLER RD NW
GA	BELLSOUTH	DMS	SPRINT PCS	ROSWELL	250 HEMBREE PKY
GA	BELLSOUTH	DMS	SPRINT PCS	ROSWELL	250 HEMBREE PKY
GA	BELLSOUTH	CMC	TRITEL COMMUNICATIONS	COLUMBUS	1324 4TH AVE
GA	BELLSOUTH	CMC	TRITON PCS	ATHENS	750 W BROAD ST
GA	BELLSOUTH	CMC	TRITON PCS	AUGUSTA	1229 ELLIS ST
GA	BELLSOUTH	CMC	TRITON PCS	SAVANNAH	1315 BULL ST
GA	BELLSOUTH	CMC	US CELLULAR	VALDOSTA	RIVER ST
GA	BELLSOUTH	CMC	US CELLULAR	WAYCROSS	3645 NEEDHAM RD
GA	BELLSOUTH	CMC	VOICESTREAM	ATHENS	125 REESE ST
GA	BELLSOUTH	AXT	VOICESTREAM	ATLANTA	250 WILLIAMS ST NW
GA	BELLSOUTH	AXT	VOICESTREAM	ATLANTA	4 CONCOURSE PARKWAY, N.E. SUITE 100
GA	BELLSOUTH	CMC	VOICESTREAM	ATLANTA	4 CONCOURSE PARKWAY, N.E. SUITE 100
GA	BELLSOUTH	CMC	VOICESTREAM	AUGUSTA	301 15TH ST
GA	BELLSOUTH	CMC	VOICESTREAM	COLUMBUS	422 14TH ST
GA	BELLSOUTH	CMC	VOICESTREAM	COLUMBUS	424 14TH ST
GA	BELLSOUTH	CMC	VOICESTREAM	LA GRANGE	300 BROOME ST
GA	BELLSOUTH	CMC	VOICESTREAM	MACON	3920 ARKWRIGHT RD
GA	BELLSOUTH	5E	VOICESTREAM	NEWNAN	203 JEFFERSON ST
GA	BELLSOUTH	CMC	VOICESTREAM	NORCROSS	5855 PEACHTREE CORNERS EAST
GA	BELLSOUTH	CMC	VOICESTREAM	NORCROSS	5855 PEACHTREE CORNERS EAST
GA	BELLSOUTH	CMC	VOICESTREAM	VALDOSTA	111 MILLER ST
HI	VERIZON	CMC	AT&T WIRELESS	KEAAU	16-212 WILIAMA PL
HI	VERIZON	CMC	AT&T WIRELESS	MILILANI	500 KAHELU AVE
IA	QWEST	5EC	AT&T WIRELESS	URBANDALE	4157 109TH ST
IA	QWEST	CMC	ELECTRONIC ENGINEERING COMPANY	DES MOINES	1100 KEOKUK
IA	QWEST	CMC	IOWA WIRELESS SERVICES	WATERLOO	501 SYCAMORE ST
IA	QWEST	DMS100	SPRINT PCS	URBANDALE	10740 AURORA AVE
IA	QWEST	DMS100	US CELLULAR	DAVENPORT	115 W 7TH ST
IA	QWEST	CMC	US CELLULAR	DES MOINES	232 SW 11TH ST
IA	QWEST	CMC	US CELLULAR	DES MOINES	2066 N 54TH AVE
IA	QWEST	CMC	US CELLULAR	DUBUQUE	9003 USHWY 52
IA	QWEST	CMC	US CELLULAR	IOWA CITY	2010 KEOKUK ST
IA	QWEST	CMC	US CELLULAR	WATERLOO	3420 RIDGE WAY AVE W
IA	QWEST	CMC	WESTERN WIRELESS	SIOUX CITY	4711 SOUTHERN HILLS DR
ID	QWEST	5ES	AT&T WIRELESS	BOISE	619 W BANNOCK ST

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
ID	VERIZON	CMC	AT&T WIRELESS	COEUR D ALENE	2115 GOVERNMENT WY
ID	VERIZON	CMC	AT&T WIRELESS	SANDPOINT	120 E LAKE ST
ID	QWEST	DMS100	EDGE WIRELESS, LLC	POCATELLO	948 N HARRISON AVE
ID	QWEST	CMC	GLENN ISHIBARA	POCATELLO	233 N MAIN ST
ID	QWEST	AXE10	LEAP WIRELESS INTL	BOISE	10215 EMERALD ST
ID	QWEST	CMC	SPRINT PCS	BOISE	1256 EXCHANGE ST
ID	QWEST	CMC	US CELLULAR	POCATELLO	1750 N 1ST AVE
IL	VERIZON	GT5	DOUGLAS TELECOMMUNICATIONS	HARRISBURG	24 W CHURCH ST
IL	VERIZON	CMC	HEARTLAND COMMUNICATIONS	BLOOMINGTON	120 N WESTERN AVE
IL	VERIZON	CMC	HEARTLAND COMMUNICATIONS	DE KALB	225 E LOCUST ST
IL	VERIZON	CMC	MERCURY COMMUNICATIONS COMPANY	OLNEY	1013 W MAIN ST
IL	VERIZON	CMC	MICHIANA METRONET	MARSHALL	W/ .25MI W/ CR 1450E ON CR 1800N
IL	VERIZON	CMC	NEXTEL	SYCAMORE	1 MI W ON RICH RD & STHWY 23
IL	VERIZON	CMC	NOVACOM	HERRIN	100 S 13TH ST
IL	VERIZON	CMC	RURAL CELLULAR CORP	CARBONDALE	.2 MI S/O DOUGLAS DR. & POULTRY CENTER RD
IL	VERIZON	DMS	SPRINT PCS	GRIDLEY	207 3RD ST
IL	VERIZON	CMC	US CELLULAR	CARTERVILLE	C/O GREENBRIER & SYCAMORE
IL	VERIZON	CMC	US CELLULAR	KEWANEE	HWY 78 1/2 MI N/O 20
IL	VERIZON	GT5	US CELLULAR	OLNEY	2 MI S/O USHWY 50 & STHWY 130
IL	VERIZON	CMC	US CELLULAR	ROCKFORD	1130 E STATE ST
IN	VERIZON	CMC	ALLTEL	ELKHART	26092 CORD 26
IN	VERIZON	5EC	AT&T WIRELESS	EVANSVILLE	4631 OHARA DR
IN	VERIZON	CMC	AT&T WIRELESS	INDIANAPOLIS	710 KENTUCKY AVE
IN	VERIZON	CMC	AT&T WIRELESS	INDIANAPOLIS	710 KENTUCKY AV
IN	VERIZON	CMC	MICHIANA METRONET	FORT WAYNE	3741 HILLEGAS RD
IN	VERIZON	CMC	MICHIANA METRONET	LOGANSPORT	416 NORTHERN AVE
IN	VERIZON	CMC	MICHIANA METRONET	RICHMOND	2460 RESERVOIR RD
IN	VERIZON	CMC	ROGERS RADIO CALL	MERRILLVILLE	3757 E 82ND CT
IN	VERIZON	CMC	SPRINT PCS	EVANSVILLE	1513 N CULLEN AVE
IN	VERIZON	DMS	SPRINT PCS	INDIANAPOLIS	5621 WEST 85 ST
IN	VERIZON	DMT	US CELLULAR	DELPHI	123 E MAIN ST
IN	VERIZON	DCO	US CELLULAR	GREENCASTLE	201 E WASHINGTON ST
IN	VERIZON	CMC	US CELLULAR	LOGANSPORT	316 E PEARL
IN	VERIZON	GT5	US CELLULAR	WABASH	122 W MARKET ST
IN	VERIZON	CMC	VOICESTREAM	INDIANAPOLIS	6215 MORENCI TRL
IN	VERIZON	CMC	WESTEL	GREENCASTLE	225 W SOUTH 350 N
IN	VERIZON	CMC	WESTEL	LAFAYETTE	2575 S 30TH ST
IN	VERIZON	DMT	WESTEL	LOOGOOTEE	305 JOHN F KENNEDY AVE
IN	VERIZON	CMC	WESTEL	TERRE HAUTE	2003 S 12TH ST
KS	SBC	DMH	METROCALL	WICHITA	8442 E 37TH ST N
KS	SBC	D12	VOICESTREAM	EMPORIA	28 W 8
KS	SBC	5E	VOICESTREAM	LAWRENCE	732 VERMONT ST
KS	SBC	DMH	VOICESTREAM	LEAVENWORTH	615 SHAWNEE ST
KS	SBC	DMH	VOICESTREAM	MANHATTAN	1640 FAIRCHILD ST
KS	SBC	AXT	VOICESTREAM	OTTAWA	625 MAIN
KY	BELLSOUTH	CMC	AT&T WIRELESS	MADISONVILLE	54 W LAKE ST @ BLDG 2
KY	VERIZON	CMC	AT&T WIRELESS	MEADS	DANNA DR @ TARPON RIDGE
KY	VERIZON	DS	AT&T WIRELESS	RICHMOND	124 S KEENELAND
KY	BELLSOUTH	DMS	BLUEGRASS NETWORKS LIMITED LIABILITY CO.	BEAVER DAM	539 ROCHESTER RD

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
KY	BELLSOUTH	CMC	BLUEGRASS NETWORKS LIMITED LIABILITY CO.	BOWLING GREEN	710 KITCHENS RD S
KY	BELLSOUTH	CMC	BLUEGRASS NETWORKS LIMITED LIABILITY CO.	HARRODSBURG	1963 CORNISHVILLE RD
KY	BELLSOUTH	DS	GEARHEART COMM. CO	HAROLD	HWY 23S OF 979
KY	VERIZON	CMC	HORIZON CELLULAR TELEPHONE CO. OF DAWSON	ELIZABETHTOWN	2471 SPRINGFIELD RD
KY	VERIZON	CMC	INDEPENDENT CELLULAR NETWORK	MEADS	TARRAPIN RIDGE RD & BUCKHAVEN CT
KY	VERIZON	CMC	INDEPENDENT CELLULAR NETWORK	RUSSELL	1/4 E OF S.R.750,1/4 S OF HWY23
KY	BELLSOUTH	CMC	KENTUCKY CGSA	LOUISVILLE	3503 COLLEGE DR
KY	BELLSOUTH	DS	KENTUCKY CGSA	OWENSBORO	320 RUDY RD
KY	BELLSOUTH	DS	KENTUCKY CGSA	WINCHESTER	OLIVER RD
KY	BELLSOUTH	CMC	NEXTEL	CORBIN	3317 CUMBERLAND FALLS HWY
KY	VERIZON	DM2	NEXTEL	LOUISVILLE	526 ARMORY PL
KY	BELLSOUTH	CMC	NEXTEL	LOUISVILLE	11003 BLUEGRASS PKWY
KY	BELLSOUTH	CMC	NEXTEL	WINCHESTER	222 W LEXINGTON AVE
KY	BELLSOUTH	DX2	NORTHSTAR TECHNOLOGY	SOMERSET	1895 HWY 461
KY	VERIZON	CMC	RAM TECHNOLOGIES	ASHLAND	2025 13TH ST
KY	VERIZON	CMC	RAMCELL OF KENTUCKY	PITTSBURG	STHWY 80
KY	VERIZON	ESS	SPRINT PCS	LOUISVILLE	2800 DIODE LN
KY	BELLSOUTH	DM5	SPRINT PCS	LOUISVILLE	2800 DIODE LN
KY	VERIZON	CMC	THIRD KENTUCKY CELLULAR CORP.	CORBIN	3333 E CUMBERLAND GAP PKY
KY	BELLSOUTH	CMC	TRITEL COMMUNICATIONS	BOWLING GREEN	1150 STATE ST
KY	BELLSOUTH	CMC	TRITEL COMMUNICATIONS	BOWLING GREEN	1150 STATE ST
KY	BELLSOUTH	CMC	TRITEL COMMUNICATIONS	LOUISVILLE	2351 NELSON MILLER PKY
KY	BELLSOUTH	CMC	VOICESTREAM	BOWLING GREEN	1150 STATE ST
KY	BELLSOUTH	CMC	VOICESTREAM	LEXINGTON	565 W MAIN ST
KY	VERIZON	CMC	VOICESTREAM	LOUISVILLE	11509 COMMONWEALTH DR
KY	VERIZON	5E	WEBLINK WIRELESS	LEXINGTON	151 S MARTIN LUTHER KING BLVD
LA	BELLSOUTH	CMC	AT&T WIRELESS	ALEXANDRIA	825 MURRAY ST
LA	BELLSOUTH	CMC	AT&T WIRELESS	BATON ROUGE	333 N 6TH ST
LA	BELLSOUTH	CMC	AT&T WIRELESS	LAKE CHARLES	902 RAILROAD AVE
LA	BELLSOUTH	CMC	AT&T WIRELESS	NEW ORLEANS	160 JAMES (ST ROSE) DR E
LA	BELLSOUTH	CMC	AT&T WIRELESS	NEW ORLEANS	160 JAMES (ST ROSE) DR E SUITE 300
LA	BELLSOUTH	CMC	AT&T WIRELESS	SCOTT	220 RUE BON SECOURS
LA	BELLSOUTH	DS	AT&T WIRELESS	SHREVEPORT	725 MCNEIL ST
LA	BELLSOUTH	CMC	BATON ROUGE CELLULAR TELEPHONE CO.	BATON ROUGE	566 LOBDELL AVE
LA	BELLSOUTH	CMC	BATON ROUGE CELLULAR TELEPHONE CO.	KENNER	1000 WILLIAMS BLVD
LA	BELLSOUTH	CMC	BATON ROUGE CELLULAR TELEPHONE CO.	NEW ORLEANS	ONE SHELL SQ
LA	BELLSOUTH	CMC	BATON ROUGE MSA LIMITED PARTNERSHIP	BATON ROUGE	2751 W. PERDUE DRIVE
LA	BELLSOUTH	D12	BATON ROUGE MSA LIMITED PARTNERSHIP	SHREVEPORT	602 CROCKETT ST
LA	BELLSOUTH	CMC	BAY STAR SATELLITE PAGING	BATON ROUGE	445 NORTH BLVD
LA	BELLSOUTH	CMC	BAY STAR SATELLITE PAGING	NEW ORLEANS	639 LOYOLA AVE
LA	BELLSOUTH	CMC	CENTENNIAL SOUTHEAST LICENSE COMPANY	ALEXANDRIA	2006 MACARTHUR DR
LA	BELLSOUTH	DMS	CENTENNIAL SOUTHEAST LICENSE COMPANY	LAFAYETTE	327 DOMINGUE AVE

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
LA	BELLSOUTH	CMC	CENTENNIAL SOUTHEAST LICENSE COMPANY	LAKE CHARLES	CALCASIEU MARINE NATIONAL
LA	BELLSOUTH	CMC	CENTENNIAL SOUTHEAST LICENSE COMPANY	LIVONIA	8853 USHWY 190
LA	BELLSOUTH	CMC	CENTURY TEL WIRELESS	ALEXANDRIA	3442 HORSESHOE DR
LA	BELLSOUTH	CMC	CENTURY TEL WIRELESS	MONROE	3005 DESOTO ST
LA	BELLSOUTH	CMC	CENTURYTEL SOLUTIONS	ALEXANDRIA	728 MURRAY ST.
LA	BELLSOUTH	CMC	CENTURYTEL SOLUTIONS	MONROE	3005 DESOTO
LA	BELLSOUTH	SNSE	CENTURYTEL SOLUTIONS	SHREVEPORT	406 COTTON ST
LA	BELLSOUTH	5E	GULF COAST WIRELESS LIMITED PARTNERSHIP	BATON ROUGE	620 FLORIDA ST
LA	BELLSOUTH	5E	GULF COAST WIRELESS LIMITED PARTNERSHIP	LAFAYETTE	110 E BUTCHER RD
LA	BELLSOUTH	CMC	LAFAYETTE MSA LIMITED PARTNERSHIP	ALEXANDRIA	825 MURRAY ST
LA	BELLSOUTH	CMC	LAFAYETTE MSA LIMITED PARTNERSHIP	LAFAYETTE	228 LANDMARK STREET
LA	BELLSOUTH	CMC	LOUISIANA CGSA	METAIRIE	1100 RIDGEWOOD AVENUE
LA	BELLSOUTH	DS	LOUISIANA CGSA	METAIRIE	1100 RIDGEWOOD AVE.
LA	BELLSOUTH	5E	LOUISIANA UNWIRED	LAKE CHARLES	410 DIVISION ST
LA	BELLSOUTH	CMC	LOUISIANA UNWIRED	MONROE	117 HART ST
LA	BELLSOUTH	5EC	LOUISIANA UNWIRED	NEW ORLEANS	639 LOYOLA AVE
LA	BELLSOUTH	5E	LOUISIANA UNWIRED	SHREVEPORT	330 MARSHALL ST
LA	BELLSOUTH	DS	METROCALL	HARVEY	1545 LAPALCO BLVD
LA	BELLSOUTH	CMC	METROCALL	METAIRIE	6820 VETERANS MEMORIAL BLVD
LA	BELLSOUTH	DMH	NEXTEL	ALEXANDRIA	251 BROWNS BEND RD
LA	BELLSOUTH	CMC	NEXTEL	BATON ROUGE	301 MAIN ST
LA	BELLSOUTH	DMH	NEXTEL	BATON ROUGE	445 NORTH BLVD
LA	BELLSOUTH	DMH	NEXTEL	LAKE CHARLES	902 RAILROAD AVE
LA	BELLSOUTH	CMC	NEXTEL	METAIRIE	3540 S I-10 SERVICE RD W
LA	BELLSOUTH	DMH	NEXTEL	MINDEN	1554 JACK MARTIN RD
LA	BELLSOUTH	DMH	NEXTEL	NATCHITOCHES	296 HWY 6
LA	BELLSOUTH	DMH	NEXTEL	SCOTT	220 RUE BON SECOURS
LA	BELLSOUTH	DMS	SPRINT PCS	KENNER	1327 DANVILLE ST
LA	BELLSOUTH	CMC	US UNWIRED	LAKE CHARLES	1 LAKESHORE DR
LA	BELLSOUTH	CMC	VOICESTREAM	METAIRIE	1 GALLERIA BLVD , 70001
MA	VERIZON	AXT	AT&T WIRELESS	BOSTON	230 CONGRESS ST
MA	VERIZON	AXT	AT&T WIRELESS	CAMBRIDGE	250 BENT ST
MA	VERIZON	AXT	AT&T WIRELESS	FRAMINGHAM	825 WAVERLY STREET
MA	VERIZON	CMC	AT&T WIRELESS	FRAMINGHAM	825 WAVERLY STREET
MA	VERIZON	5E	AT&T WIRELESS	SOUTHBORO	155 NORTHBORO RD
MA	VERIZON	5E	METROCALL	BURLINGTON	1 BEDFORD ST
MA	VERIZON	DMH	METROCALL	SPRINGFIELD	295 WORTHINGTON ST
MA	VERIZON	CMC	NEXTEL	BOSTON	1255 BOYLSTON ST
MA	VERIZON	CMC	NEXTEL	MANSFIELD	135 FORBES BLVD
MA	VERIZON	5E	NEXTWAVE	MARLBORO	19 BRIGHAM ST
MA	VERIZON	CMC	RURAL CELLULAR CORP	SHELBURNE	OLD ALBANY RD
MA	VERIZON	5E	SPRINGWICH CELLULAR LIMITED PARTNERSHIP	SPRINGFIELD	295 WORTHINGTON ST
MA	VERIZON	4E	SPRINT PCS	CAMBRIDGE	250 BENT ST
MA	VERIZON	5E	SPRINT PCS	WALPOLE	10 WALPOLE PARK S
MA	VERIZON	CMC	SPRINT PCS	WALPOLE	10 WALPOLE PARK S
MA	VERIZON	5E	SPRINT PCS	WOBURN	74 COMMERCE WAY
MA	VERIZON	CMC	SPRINT PCS	WOBURN	74 COMMERCE WAY

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
MD	VERIZON	DS	AT&T WIRELESS	BALTIMORE	323 N CHARLES ST
MD	VERIZON	ESS	DOBSON CELLULAR SYSTEMS	FREDERICK	5330 SPECTRUM DR
MD	VERIZON	CMC	DOBSON CELLULAR SYSTEMS	OAKLAND	EAGLE ROCK RD
MD	VERIZON	CMC	DOBSON CELLULAR SYSTEMS	SALISBURY	BRICK KILN RD
MD	VERIZON	DS	HORIZON CELLULAR TELEPHONE CO. OF DAWSON	EASTON	402 BROOKLETTE AVE
MD	VERIZON	DS	HORIZON CELLULAR TELEPHONE CO. OF DAWSON	HOLLYWOOD	24779 MCINTOSH RD
MD	VERIZON	5E	METROCALL	DAMASCUS	LEWIS DR
MD	VERIZON	CMC	NEXTEL	BALTIMORE	109 MARKET PLC
MD	VERIZON	DMH	NEXTEL	BALTIMORE	201 N CHARLES ST
MD	VERIZON	DS	NEXTEL	FREDERICK	9450F GAMBRILL PARK RD
MD	VERIZON	CMC	NEXTEL	HANOVER (ANNE ARUNDEL)	7249 NATIONAL DR
MD	VERIZON	5E	NEXTEL	SALISBURY	2530 N SALISBURY BLVD
MD	VERIZON	DMH	NEXTEL	SILVER SPRING	11900 BOURNEFIELD WAY
MD	VERIZON	DMH	PREFERRED NETWORKS	MUIRKIRK	12212 BALTIMORE AVE
MD	VERIZON	CMC	SPRINT PCS	BELTSVILLE	12001 INDIAN CREEK CT
MD	VERIZON	CMC	SPRINT PCS	BELTSVILLE	12001 INDIAN CREEK CT
MD	VERIZON	DS	SPRINT PCS	BELTSVILLE	12001 INDIAN CREEK CT
MD	VERIZON	DS	SPRINT PCS	BELTSVILLE	12001 INDIAN CREEK CT
MD	VERIZON	5E	SPRINT PCS	HANOVER (ANNE ARUNDEL)	7267 PARK CIRCLE DR
MD	VERIZON	5E	SPRINT PCS	SALISBURY	613 CALLOWAY ST
MD	VERIZON	DS	US CELLULAR	HAGERSTOWN	S MULBERRY ST
MD	VERIZON	CMC	US CELLULAR	THAYERVILLE	RTE 2
MD	VERIZON	5E	VOICESTREAM	HAGERSTOWN	960 WILLOW CIR
MD	VERIZON	DS	VOICESTREAM	HANOVER	7267 PARK CIRCLE DR
ME	VERIZON	DS	AT&T WIRELESS	WESTBROOK	12 SAUNDERS WAY (HUT)
ME	VERIZON	D12	MRCC	BANGOR	BOMARC RD @ (MULTI OFFICE BLDG)
ME	VERIZON	D12	MRCC	PORTLAND	45 FOREST AVE
ME	VERIZON	CMC	SACO RIVER CELL TEL CO	BIDDEFORD	124 OAK RIDGE RD
ME	VERIZON	D12	US CELLULAR	AUGUSTA	SHAW HILL
ME	VERIZON	DM5	US CELLULAR	MANCHESTER	TOWER ROAD
MI	VERIZON	CMC	CENTURY TEL WIRELESS	ADRIAN	6787 PENTECOST HWY
MI	VERIZON	CMC	CENTURY TEL WIRELESS	ADRIAN	103 1/2 SAND CREEK HWY
MI	VERIZON	CMC	CENTURY TEL WIRELESS	ALPENA	W/O FRENCH RD ON NAYLOR RD
MI	VERIZON	5EH	CENTURY TEL WIRELESS	MUSKEGON	860 TERRACE ST
MI	VERIZON	EX2	CENTURY TEL WIRELESS	MUSKEGON	1781 N SHERIDAN RD
MI	VERIZON	CMC	MICHIANA METRONET	BATTLE CREEK	14650 BEADLE LAKE RD
MI	VERIZON	CMC	MICHIANA METRONET	JACKSON	120 W MICHIGAN AVE
MI	VERIZON	CMC	MICHIANA METRONET	MOUNT PLEASANT	1166 E REMUS RD
MI	VERIZON	CMC	NEXTEL	GRAND RAPIDS	114 N DIVISION AVE
MI	VERIZON	CMC	NEXTEL	SOUTHFIELD	100 GALLERIA OFFICENTRE
MI	VERIZON	CMC	SPRINT PCS	DETROIT	1320 THIRD ST
MI	VERIZON	CMC	VOICESTREAM	LIVONIA	12170 MERRIMAN RD
MN	QWEST	CMC	AT&T WIRELESS	HIBBING	3553 MAPLE HILL RD
MN	QWEST	5ES	AT&T WIRELESS	MINNEAPOLIS	2515 24TH AVE S
MN	QWEST	CMC	AT&T WIRELESS	MINNEAPOLIS	2515 24TH AVE S
MN	QWEST	CMC	CELLULAR MOBILE SYSTEMS OF ST. CLOUD GEN PARTNERSH	MINNEAPOLIS	618 2ND AVE S

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
MN	QWEST	CMC	CELLULAR MOBILE SYSTEMS OF ST. CLOUD GEN PARTNERSH	ST CLOUD	3563 CORD 136
MN	QWEST	CMC	CYBERTEL MINNEAPOLIS PAGING	GOLDEN VALLEY	610 OTTAWA AVE N
MN	QWEST	CMC	HEARTLAND COMMUNICATIONS	GOLDEN VALLEY	747 BOONE AVE N
MN	QWEST	CMC	MIDWEST WIRELESS COMMUNICATION	MINNEAPOLIS	618 2ND AVE S
MN	QWEST	CMC	MIDWEST WIRELESS COMMUNICATION	ROCHESTER	220 S BROADWAY
MN	QWEST	CMC	NEXTEL	MINNEAPOLIS	511 11TH AVE S
MN	QWEST	CMC	RURAL CELLULAR CORP	CAMBRIDGE	540 N EMERSON AVE
MN	QWEST	CMC	SOURCE ONE WIRELESS	MINNEAPOLIS	618 2ND AVE S
MN	QWEST	DMS100	SPRINT PCS	MINNEAPOLIS	511 11TH AVE S
MN	QWEST	DMS100	SPRINT PCS	MINNEAPOLIS	511 11TH AVE S
MN	QWEST	CMC	SPRINT PCS	ST CLOUD	3563 CORD 136
MN	QWEST	CMC	VOICESTREAM	EAGAN	3070 LUNAR LN
MN	QWEST	CMC	WESTERN WIRELESS	CROOKSTON	SECTION 3 T149N R47W
MO	VERIZON	D12	ALLTEL	BRANSON	211 S 3RD ST
MO	SBC	5E	METROCALL	KANSAS CITY	107 E 39TH ST
MO	SBC	DMH	METROCALL	KANSAS CITY	1101 MCGEE
MO	SBC	DMH	METROTEL	ST LOUIS	1010 PINE
MO	VERIZON	5E	SPRINT PCS	JEFFERSON CITY	1309 EDGEWOOD
MO	SBC	DMH	TELETOUCH COMMUNICATIONS	SPRINGFIELD	3028 S. FREMONT
MO	SBC	AXT	VOICESTREAM	MARSHALL	210 E ARROW
MS	BELLSOUTH	D12	CELLULAR XL ASSOCIATES	HATTIESBURG	#17 IVEY LN
MS	BELLSOUTH	DMS	CELLULAR XL ASSOCIATES	HATTIESBURG	#17 IVY LN
MS	BELLSOUTH	CMC	CENTENNIAL SOUTHEAST LICENSE COMPANY	NATCHEZ	231 JOHN R JUNKIN DR
MS	BELLSOUTH	SNSE	CENTURY TEL WIRELESS	GULFPORT	11270 CREEL CIR
MS	BELLSOUTH	SNSE	CENTURY TEL WIRELESS	JACKSON	210 E CAPITOL ST, SUITE 2174
MS	BELLSOUTH	CMC	DIG1PH PCS	GULFPORT	333 COWAN RD
MS	BELLSOUTH	CMC	DIG1PH PCS	HATTIESBURG	4225 MAMIE ST
MS	BELLSOUTH	CMC	MCTA	JACKSON	293 MARKETRIDGE DR
MS	BELLSOUTH	CMC	METROCALL	JACKSON	5570 I 55 N
MS	BELLSOUTH	DMH	NEXTEL	BILOXI	850 BAYVIEW AVE
MS	BELLSOUTH	CMC	NEXTEL	JACKSON	210 E PEARL ST
MS	BELLSOUTH	DMH	NEXTEL	LONG BEACH	112 N OCAN WAVE AVE
MS	BELLSOUTH	DMH	NEXTEL	PASCAGOULA	1783 OLD MOBILE AVE
MS	BELLSOUTH	CMC	SOUTHERN COMMUNICATIONS SERVICES	GULFPORT	2221 17TH ST
MS	BELLSOUTH	CMC	SOUTHERN COMMUNICATIONS SERVICES	HATTIESBURG	100 BRUNIE ST
MS	BELLSOUTH	CMC	SOUTHERN COMMUNICATIONS SERVICES	MERIDIAN	2401 11TH ST
MS	BELLSOUTH	DS	TELEPAK	GULFPORT	1723 22ND AVE & 18TH
MS	BELLSOUTH	CMC	TELEPAK	JACKSON	125 S CONGRESS ST
MS	BELLSOUTH	DMS	TELEPAK	JACKSON	125 S CONGRESS ST
MS	BELLSOUTH	CMC	TELETOUCH COMMUNICATIONS	JACKSON	1220 E NORTHSIDE DR
MS	BELLSOUTH	CMC	TRITEL COMMUNICATIONS	GULFPORT	1723 22ND AVE
MS	BELLSOUTH	CMC	TRITEL COMMUNICATIONS	RIDGELAND	371 HIGHLAND COLONY PKY
MS	BELLSOUTH	5E	US UNWIRED	GREENWOOD	69601 HWY 82 W
MS	BELLSOUTH	AXT	VOICESTREAM	JACKSON	308 E PEARL ST
MS	BELLSOUTH	AXT	VOICESTREAM	MERIDIAN	2401 11TH ST
MS	BELLSOUTH	DS	VOICESTREAM	TUPELO	1910 N GLOSTER DR (HWY 45)
MT	QWEST	DMS100	MONTANA WIRELESS	MISSOULA	1810 DEFOE ST
MT	QWEST	5EC	WESTERN WIRELESS	BILLINGS	2000 COBURN RD
MT	QWEST	CMC	WESTERN WIRELESS	BILLINGS	2000 COBURN RD
MT	QWEST	CMC	WESTERN WIRELESS	GREAT FALLS	3720 BOOTLEGGER TRL

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
MT	QWEST	CMC	WESTERN WIRELESS	MISSOULA	3100 PAXSON ST @ S32T13NR19W
NC	BELLSOUTH	DS	ALLTEL	GARNER	3651 JUNCTION BLVD
NC	BELLSOUTH	CMC	ALLTEL	LEXINGTON	18 E 2ND AVE
NC	VERIZON	E25	ALLTEL	MATTHEWS	1101 MATTHEWS - MINT HILL RD
NC	BELLSOUTH	DS	ARCH WIRELESS HOLDINGS	CHARLOTTE,	1932 W MOREHEAD ST
NC	BELLSOUTH	CMC	AT&T WIRELESS	CHARLOTTE	3390 SERVICE ST
NC	VERIZON	CMC	AT&T WIRELESS	DURHAM	5616 CHIN PAGE RD
NC	BELLSOUTH	CMC	AT&T WIRELESS	GREENSBORO	301 S ELM ST
NC	BELLSOUTH	CMC	AT&T WIRELESS	WINSTON-SALEM	1480 S BROAD ST
NC	BELLSOUTH	5EC	CRICKET COMMUNICATIONS	CHARLOTTE	2915 WHITEHALL PARK DR
NC	BELLSOUTH	5EC	CRICKET COMMUNICATIONS	GREENSBORO	4351 FEDERAL DR
NC	BELLSOUTH	DS	METROCALL	ASHEVILLE	640 MERRIMON AVE
NC	VERIZON	DMH	METROCALL	DURHAM	2314 NELSON CHAPEL HILL HWY
NC	BELLSOUTH	CMC	METROCALL	RALEIGH	3100 HIGHWOODS BLVD
NC	BELLSOUTH	DS	METROCALL	WILMINGTON	108 HARLEY RD
NC	BELLSOUTH	DMH	NEXTEL	CHARLOTTE	3109 WESTINGHOUSE BL
NC	BELLSOUTH	CMC	NEXTEL	GREENSBORO	610 INDUSTRIAL AVE
NC	BELLSOUTH	CMC	NEXTEL	LEXINGTON	18 E 2ND AVE
NC	VERIZON	CMC	NEXTEL	RALEIGH	3100 SMOKETREE CT
NC	BELLSOUTH	CMC	TRITON PCS	ASHEVILLE	340 VICTORIA RD
NC	BELLSOUTH	AXT	TRITON PCS	GOLDSBORO	118 S BERKLY BLVD
NC	BELLSOUTH	AXT	TRITON PCS	LAURINBURG	13900 DIXIE GUANO RD
NC	BELLSOUTH	AXT	TRITON PCS	LUMBERTON	491 POWER PLANT RD
NC	BELLSOUTH	CMC	TRITON PCS	WILMINGTON	4428 S COLLEGE RD
NC	BELLSOUTH	CMC	US CELLULAR	ASHEVILLE	36 RESERVOIR RD
NC	BELLSOUTH	CMC	US CELLULAR	FOREST CITY	925 S MOUNTAIN RD
NC	BELLSOUTH	CMC	US CELLULAR	GOLDSBORO	.45M N OF SR 1235 & SR 1236
NC	VERIZON	DMH	US CELLULAR	MARION	17 N GARDEN ST
NC	BELLSOUTH	DM2	US CELLULAR	REIDSVILLE	.8MI E OF HWY 29 & HWY 158
NC	BELLSOUTH	DMH	US CELLULAR	WILMINGTON	322 VAN DYKE
NC	VERIZON	DMH	WEBLINK WIRELESS	DURHAM	104 HOLLOWAY ST
ND	QWEST	CMC	WESTERN WIRELESS	BISMARCK	1925 N 11TH ST
NE	QWEST	CMC	ARCH WIRELESS HOLDINGS	OMAHA	122 S 77TH ST
NE	QWEST	5ES	AT&T WIRELESS	OMAHA	118 S 19TH ST
NE	QWEST	CMC	LINCOLN TELECOM. CORP.	OMAHA	10630 BURT
NE	QWEST	CMC	LINCOLN TELECOM. CORP.	OMAHA	10630 BURT
NE	QWEST	DMS100	SPRINT PCS	OMAHA	4829 S 114TH ST
NH	VERIZON	DMS	AT&T WIRELESS	DOVER	20 ABBEY SAWYER MEMORIAL HWY
NH	VERIZON	5E	METROCALL	MANCHESTER	25 CONCORD ST
NH	VERIZON	5E	RURAL CELLULAR CORP	CLAREMONT	GREEN MOUNTAIN RD
NH	VERIZON	DMS	RURAL CELLULAR CORP	WEST LEBANON	STATE HWY 12A S/O I89 HWY
NH	VERIZON	CMC	SACO RIVER CELL TEL CO	DOVER	LONG HILL RD @ (MULTI OFFICE BLDG)
NH	VERIZON	CMC	SPRINT PCS	LONDONDERRY	34 LONDONDERRY RD
NH	VERIZON	CMC	US CELLULAR	MERRIMACK	CARON ST
NJ	VERIZON	CMC	AQUIS COMMUNICATIONS	HAMILTON SQUARE	1300 WHITE HORSE RD & HAMILTON SQ
NJ	VERIZON	CMC	AT&T WIRELESS	NEWARK	95 WILLIAM ST
NJ	VERIZON	CMC	AT&T WIRELESS	NEWARK	95 WILLIAM ST

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
NJ	VERIZON	CMC	AT&T WIRELESS	NEWARK	95 WILLIAM ST
NJ	VERIZON	CMC	AT&T WIRELESS	PORT MURRAY-WARREN	HOFFMAN RD
NJ	VERIZON	CMC	AT&T WIRELESS	TETERBORO	100 HOLLISTER RD
NJ	VERIZON	DS	MAP MOBILE COMMUNICATIONS	HADDON HEIGHTS	505 BLACKHORSE PIKE
NJ	VERIZON	CMC	NEXTEL	ATLANTIC CITY	2715 BOARDWALK AVE
NJ	VERIZON	CMC	NEXTEL	CHERRY HILL	BURNT MILL & BERLIN
NJ	VERIZON	CMC	NEXTEL	FAIRFIELD (ESSEX)	2 INDUSTRIAL RD
NJ	VERIZON	CMC	NEXTEL	HACKENSACK	25 MAIN ST COURT PL
NJ	VERIZON	CMC	NEXTEL	PLEASANTVILLE - ATLAN	40 E GRANT ST
NJ	VERIZON	CMC	SPRINT PCS	BRANCHBURG TOWNSHIP	24 COUNTY LINE RD
NJ	VERIZON	CMC	SPRINT PCS	PENNSAUKEN	8440 REMINGTON AVE
NJ	VERIZON	5E	SPRINT PCS	TETERBORO	100 HOLLISTER RD
NJ	VERIZON	5E	SPRINT PCS	TETERBORO	100 HOLLISTER RD
NJ	VERIZON	DS	TSR WIRELESS	FORT LEE	400 KELBY ST
NJ	VERIZON	CMC	VOICESTREAM	CAMDEN	12 N SEVENTH ST
NJ	VERIZON	CMC	VOICESTREAM	PLEASANTVILLE - ATLAN	420 W WASHINGTON AV
NJ	VERIZON	CMC	VOICESTREAM	WAYNE	360 NEWARK POMPTON TPKE
NJ	VERIZON	CMC	VOICESTREAM	WAYNE	360 NEWARK POMPTON TPKE
NJ	VERIZON	CMC	VOICESTREAM	WAYNE	360 NEWARK POMPTON TPKE
NJ	VERIZON	DM1	VOICESTREAM	WAYNE	360 NEWARK POMPTON TPKE
NM	QWEST	CMC	ALLTEL	LAS CRUCES	670 N MOTEL BLVD
NM	QWEST	CMC	ALLTEL	SANTA FE	4200 RODEO RD
NM	QWEST	CMC	AT&T WIRELESS	ALBUQUERQUE	111 3RD ST NW
NM	QWEST	CMC	CONTACT NEW MEXICO	ALBUQUERQUE	10820 CENTRAL AVE SE
NM	QWEST	5EC	LEAP WIRELESS INTL	ALBUQUERQUE	2420 COMANCHE RD NE
NM	QWEST	CMC	MAGNACOM WIRELESS	ALBUQUERQUE	3830 SINGER BLVD NE
NM	VERIZON	D12	PVT WIRELESS LIMITED PARTNERSHIP	COTTONWOOD	R 553 NORTH 13TH
NM	QWEST	DMS100	SPRINT PCS	ALBUQUERQUE	2445 ALAMO AVE S E
NM	QWEST	CMC	VOICESTREAM	ALBUQUERQUE	4830 PAN AMERICAN FREEWAY NE
NM	QWEST	CMC	VOICESTREAM	SANTA FE	210 E MARCY ST
NV	VERIZON	CMC	AT&T WIRELESS	RENO	195 E 1ST ST
NV	SBC	D12	NEXTEL	RENO	3425 GULLING RD
NV	VERIZON	CMC	SPRINT PCS	RENO	5355 CAPITAL CT
NY	VERIZON	5EC	AT&T WIRELESS	BUFFALO	65 FRANKLIN ST
NY	VERIZON	5E	AT&T WIRELESS	CHEEKTOWAGA	1690 WALDEN AVE
NY	VERIZON	5E	AT&T WIRELESS	HUNTINGTON	1444 E JERICHO TPKE
NY	VERIZON	5E	AT&T WIRELESS	HUNTINGTON	1444 E JERICHO TPKE #1ST FLOOR
NY	VERIZON	5E	AT&T WIRELESS	HUNTINGTON	1444 E JERICHO TPKE
NY	VERIZON	CMC	AT&T WIRELESS	MANHATTAN	33 THOMAS ST
NY	VERIZON	CMC	AT&T WIRELESS	MANHATTAN	33 THOMAS ST
NY	VERIZON	5E	AT&T WIRELESS	QUEENS	9415 100TH ST
NY	VERIZON	DMH	AT&T WIRELESS	SOUTHPORT	1 COMFORT HILL RD
NY	VERIZON	CMC	AT&T WIRELESS	WHITE PLAINS	400 HAMILTON AVE
NY	VERIZON	AXT	BUFFALO TELEPHONE COMPANY DBA CELLULAR ONE BUFFALO	BUFFALO	RAND BLDG
NY	VERIZON	AXT	GENESEE TELEPHONE CO	ARCADIA	1550 FT SW/O MAXISON RD & LEMBKE RD

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
NY	VERIZON	5EH	LINCOLN COMMUNICATIONS	ALBANY	158 STATE ST
NY	VERIZON	5E	MAP MOBILE COMMUNICATIONS	GARDEN CITY	741 ZECKENDORF BLVD
NY	VERIZON	CMC	MAP MOBILE COMMUNICATIONS	HICKSVILLE	240 N BROADWAY
NY	VERIZON	DMH	METROCALL	NYACK	15 CEDAR ST
NY	VERIZON	DMH	METROCALL	PLEASANTVILLE	465 MARBLE AV
NY	VERIZON	G3L	METROCALL	SYRACUSE	2949 ERIE BLVD E
NY	VERIZON	5E	METROCALL	YAPHANK	YAPHANK MIDDLE ISLAN
NY	VERIZON	DMH	NEXTEL	ELMSFORD	175 CLEARBROOK RD
NY	VERIZON	CMC	NEXTEL	GARDEN CITY	1 SOUTH ST
NY	VERIZON	DMH	NEXTEL	GARDEN CITY	1 SOUTH ST
NY	VERIZON	CMC	NEXTEL	SYRACUSE	1005 W FAYETTE ST
NY	VERIZON	CMC	PREFERRED NETWORKS	PLAINVIEW	101 FAIRCHILD AVE
NY	VERIZON	G3X	PREFERRED NETWORKS	SYOSSET	575 UNDERHILL BLVD
NY	VERIZON	5E	SPRINT PCS	ALBANY	3 ENTERPRISE DR
NY	VERIZON	CMC	SPRINT PCS	CHEEKTOWAGA	50 DEWBERRY LN
NY	VERIZON	CMC	SPRINT PCS	MANHATTAN	111 8TH AVE
NY	VERIZON	CMC	SPRINT PCS	MANHATTAN	111 8TH AVE
NY	VERIZON	5E	SPRINT PCS	WESTBURY (NASSAU)	75 FROST ST
NY	VERIZON	5E	SPRINT PCS	WESTBURY (NASSAU)	75 FROST ST
NY	VERIZON	CMC	SPRINT PCS	WESTBURY (NASSAU)	75 FROST ST
NY	VERIZON	CMC	SPRINT PCS	WESTBURY (NASSAU)	75 FROST ST
NY	VERIZON	DMH	SYGNET COMMUNICATIONS	BUFFALO	1800 RAND BUILDING 14 LAFAYETTE SQUARE
NY	VERIZON	DMH	SYGNET COMMUNICATIONS	OLEAN	PAGE RD
NY	VERIZON	CMC	VOICESTREAM	BOHEMIA	21 KEYLAND CT
NY	VERIZON	DM1	VOICESTREAM	BOHEMIA	21 KEYLAND CT
NY	VERIZON	DM5	VOICESTREAM	SALINA	103 MONARCH DR
NY	VERIZON	5E	WEBLINK WIRELESS	BUFFALO	65 FRANKLIN ST
NY	VERIZON	5E	WEBLINK WIRELESS	SYRACUSE	201 S STATE ST
OH	VERIZON	CMC	ALLTEL	NORTH FAIRFIELD	JCT SR 150 & TOWN LN RD 131
OH	VERIZON	CMC	AT&T WIRELESS	ATHENS	7654 BITTERSWEET LN
OH	VERIZON	DM5	AT&T WIRELESS	ATHENS	7800 ROCK RIFFLE RD
OH	VERIZON	CMC	AT&T WIRELESS	CAMBRIDGE	63970 LARRICK RIDGE RD
OH	VERIZON	CMC	AT&T WIRELESS	DOVER	W SIDE OF TOWN ON TWP 384
OH	VERIZON	CMC	AT&T WIRELESS	PORTSMOUTH	2736 SCIOTO TRL
OH	SBC	5EC	BROADWING	BLUE ASH	11480 NORTHLAKE DR
OH	SBC	NT5	BROADWING	BLUE ASH	11480 NORTHLAKE DR
OH	SBC	5EC	BROADWING	DAYTON	40 W 4TH ST & (PRIMARY BLDG)
OH	VERIZON	DMH	DOBSON CELLULAR SYSTEMS	BELLEVUE	2481 COUNTRY RD 302 RD
OH	VERIZON	CMC	INDEPENDENT CELLULAR NETWORK	ATHENS	N/O USHWY 33 ON PEACH RIDGE RD
OH	VERIZON	CMC	INDEPENDENT CELLULAR NETWORK	STONE CREEK	6959 BUEHLER HILL RD
OH	VERIZON	CMC	NEXTEL	TOLEDO	319 MADISON AVE
OH	VERIZON	CMC	RAM TECHNOLOGIES	SCIOTOVILLE	6416 GALLIA ST
OH	VERIZON	CMC	SOUTHERN OHIO COMMUNICATION SERVICES	WAVERLY	100 E THIRD ST
OH	VERIZON	CMC	SPRINT PCS	CHILLICOTHE	68 E MAIN ST
OH	VERIZON	CMC	US CELLULAR	PORTSMOUTH	2574 SUNRISE AVE
OH	VERIZON	CMC	VOICESTREAM	TOLEDO	130 N ERIE ST
OR	QWEST	CMC	ARCH WIRELESS HOLDINGS	PORTLAND	5901 SW MACADAM AVE
OR	QWEST	CMC	AT&T WIRELESS	EUGENE	1398 WILLAMETTE ST
OR	QWEST	CMC	AT&T WIRELESS	MEDFORD	435 N BARTLETT ST

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
OR	QWEST	CMC	AT&T WIRELESS	PORTLAND	819 SW OAK ST
OR	QWEST	CMC	AT&T WIRELESS	PORTLAND	819 SW OAK ST
OR	QWEST	AXE10	LEAP WIRELESS INTL	SALEM	3995 FAIRVIEW INDUSTRIAL DR SE
OR	QWEST	CMC	NEXTEL	EUGENE	76 CENTENNIAL LOOP
OR	QWEST	CMC	NEXTEL	PORTLAND	511 SW 10TH AVE
OR	VERIZON	CMC	RCC HOLDINGS	PENDLETON	1660 NW 49TH
OR	QWEST	CMC	SPRINT PCS	BEAVER CREEK	BEAVER CREEK
OR	QWEST	CMC	SPRINT PCS	PORTLAND	215 SE MORRISON ST
OR	QWEST	5ES	SPRINT PCS	TIGARD	10799 SW CASCADE BLVD
OR	QWEST	CMC	SPRINT PCS	TIGARD	10799 SW CASCADE BLVD
OR	VERIZON	CMC	SPRINT PCS	TIGARD	10799 SW CASCADE BLVD
OR	QWEST	DMS100	US CELLULAR	MEDFORD	515 PARSONS DR
OR	QWEST	CMC	VOICESTREAM	PORTLAND	1500 NE IRVING ST
PA	VERIZON	CMC	ALLTEL	AVOCA	1400 SPRUCE ST
PA	VERIZON	DS	ALLTEL	HARRISBURG	COCKLEY RD
PA	VERIZON	CMC	ALLTEL	OIL CITY	.23 MI W/O HORNE LN & GRANDVIEW RD
PA	VERIZON	DS	ALLTEL	WARREN	109 CHAPMAN RD
PA	VERIZON	CMC	ALLTEL	YORK	WQXA TOWER LOCN
PA	VERIZON	DS	AMERICELL	LOCK HAVEN	GLEN RD
PA	VERIZON	CMC	AQUIS COMMUNICATIONS	HARRISBURG	210 PINE ST
PA	VERIZON	CMC	AQUIS COMMUNICATIONS	PHILADELPHIA	900 RACE ST
PA	VERIZON	DM5	AT&T WIRELESS	ALLEGHENY	2463 N. OLD RT220
PA	VERIZON	DM5	AT&T WIRELESS	CATAWISSA	RD2
PA	VERIZON	DS	AT&T WIRELESS	CRAFTON	270 BILMAR DRIVE
PA	VERIZON	DS	AT&T WIRELESS	CRAFTON	270 BILMAR DRIVE
PA	VERIZON	DS	AT&T WIRELESS	HARRISBURG	4375 LEWIS RD
PA	VERIZON	NT5	AT&T WIRELESS	HUGHESVILLE	BUCK HILL RD WLPT CELLULA
PA	VERIZON	CMC	AT&T WIRELESS	PHILADELPHIA	500 S 27TH ST
PA	VERIZON	CMC	AT&T WIRELESS	SOMERSET	WILLS CHURCH RD
PA	VERIZON	DS	AT&T WIRELESS	WILKES-BARRE	485 LASLEY AVE
PA	VERIZON	DM5	AT&T WIRELESS	YORK	1803 MT ROSE AVE
PA	VERIZON	CMC	CONESTOGA WIRELESS COMPANY	BOYERTOWN	E 2ND ST & WARWICK ST
PA	VERIZON	ESS	MAP MOBILE COMMUNICATIONS	PHILADELPHIA	21 S 63 ST
PA	VERIZON	CMC	METROCALL	ERIE	1324 CHESTNUT ST
PA	VERIZON	CMC	METROCALL	JOHNSTOWN (CAMBRIA)	RESEVOIR PARK RD WESTMONT
PA	VERIZON	D12	NEXTEL	AUDUBON	901 JEFFERSON AVE
PA	VERIZON	CMC	NEXTEL	BRIDGEVILLE	400 BURSCA DR
PA	VERIZON	CMC	NEXTEL	HARRISBURG	210 PINE ST
PA	VERIZON	CMC	NEXTEL	PHILA	1818 MARKET ST., FLR 38
PA	VERIZON	DS	PREFERRED NETWORKS	PITTSBURGH	1485 CRANE AVE
PA	VERIZON	5EC	SOUTH CANAAN CELLULAR COMMUNICATIONS COMPANY	SOUTH CANAAN	RT 296 @ BOX 160
PA	VERIZON	5E	SPRINT PCS	PHILADELPHIA	401 N BROAD ST
PA	VERIZON	5E	SPRINT PCS	PHILADELPHIA	401 N BROAD ST
PA	VERIZON	5E	SPRINT PCS	PITTSBURGH	22 39TH ST
PA	VERIZON	CMC	SPRINT PCS	PITTSBURGH	22 39TH ST
PA	VERIZON	RSM	SYGNET COMMUNICATIONS	WEST VIEW	122 BLUEBELLE ST
PA	VERIZON	CMC	TERN WIRELESS	STROUDSBURG	9 S 7TH ST
PA	VERIZON	DMH	VOICESTREAM	EPHRATA	130 E MAIN ST
PA	VERIZON	DX2	VOICESTREAM	PITTSBURGH	6437 DAHLEM PL.

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
PA	VERIZON	CMC	VOICESTREAM	WEST NORRITON	30 S MONTGOMERY AVE
RI	VERIZON	AXT	AT&T WIRELESS	PROVIDENCE	1 GREENE ST
RI	VERIZON	DMH	METROCALL	PROVIDENCE	234 WASHINGTON ST
RI	VERIZON	DM2	NEXTEL	PROVIDENCE	234 WASHINGTON ST
RI	VERIZON	CMC	VOICESTREAM	EAST PROVIDENCE	50 CATAMORE BLVD
RI	VERIZON	CMC	VOICESTREAM	PROVIDENCE	1 GREENE ST
SC	BELLSOUTH	5E	AIRGATE WIRELESS	COLUMBIA	411 HUGER ST
SC	VERIZON	GT5	ALLTEL	GEORGETOWN	1113 FRONT ST
SC	VERIZON	DCO	ALLTEL	LAURENS	LAURENS CELL SITE RURAL ROUTE 3 OFF SC HWY 14N
SC	BELLSOUTH	CMC	ALLTEL	NORTH CHARLESTON	4920 APPIAN WAY
SC	BELLSOUTH	CMC	ALLTEL	PIEDMONT	6931 STHWY 81
SC	VERIZON	CMC	AT&T WIRELESS	MYRTLE BEACH	48TH AVE N & HWY 17
SC	VERIZON	CMC	CAROLINA PCS 1 LIMITED PARTNERSHIP	COLUMBIA	1426 MAIN ST
SC	BELLSOUTH	CMC	CAROLINA PCS 1 LIMITED PARTNERSHIP	FLORENCE	224 W CHEVES ST
SC	VERIZON	DS	CAROLINA PCS 1 LIMITED PARTNERSHIP	GREENVILLE	400 BROOKFIELD PARWAY
SC	BELLSOUTH	CMC	METROCALL	GREENVILLE	1901 LAURENS RD
SC	BELLSOUTH	DS	NEXTEL	CHARLESTON	478 E BAY ST
SC	BELLSOUTH	DS	NEXTEL	COLUMBIA	124 S ASSEMBLY ST
SC	BELLSOUTH	DS	NEXTEL	GREENVILLE	7N LAURENS ST
SC	BELLSOUTH	CMC	SPRINT PCS	GREENVILLE	12 LOGUE CT
SC	BELLSOUTH	Z22	TEEPAGE INC. COMMUNICATIONS	GREENVILLE	2919 WHITE HORSE RD
SC	BELLSOUTH	CMC	TELE-ONE COMMUNICATIONS	NORTH AUGUSTA	114 SIDEREAL AVE
SC	BELLSOUTH	CMC	TRITON PCS	CHARLESTON	185 FAIRCHILD DR
SC	BELLSOUTH	CMC	TRITON PCS	FLORENCE	224 W CHEVES ST
SC	BELLSOUTH	CMC	TRITON PCS	IRMO	800 LAKE MURRAY BLVD
SC	BELLSOUTH	CMC	TRITON PCS	IRMO	800 LAKE MURRAY BLVD
SC	VERIZON	CMC	TRITON PCS	MYRTLE BEACH	1455 CANNON RD
SC	VERIZON	CMC	TRITON PCS	MYRTLE BEACH	1455 CANNON ROAD
SC	BELLSOUTH	RSM	VOICESTREAM	NORTH AUGUSTA	114 SIDEREAL AVE
SC	VERIZON	DMH	WEBLINK WIRELESS	MYRTLE BEACH	914 E CHESTER ST @ 9TH AVE
SD	QWEST	CMC	WESTERN WIRELESS	RAPID CITY	2449 W CHICAGO ST
SD	QWEST	CMC	WESTERN WIRELESS	SIOUX FALLS	2800 W 10TH ST
SD	QWEST	CMC	WIRELESS ALLIANCE LLC	SIOUX FALLS	2900 W 10TH ST
TN	BELLSOUTH	DC0	ADVANTAGE CELLULAR SYSTEMS	SMITHVILLE	104 W BROAD ST
TN	BELLSOUTH	CMC	ARCH WIRELESS HOLDINGS	KNOXVILLE	425 W DEPOT AVE
TN	BELLSOUTH	CMC	AT&T WIRELESS	MEMPHIS	4400 S MENDENHALL RD
TN	BELLSOUTH	CMC	AT&T WIRELESS	MORRISTOWN	1199 SHANNON LITTLE MOUNTAIN RD
TN	BELLSOUTH	CMC	CHATTANOOGA MSA LIMITED PARTNERSHIP	CHATTANOOGA	5718 LEE HWY
TN	BELLSOUTH	5E	CRICKET COMMUNICATIONS	CHATTANOOGA	515 AIRPORT RD
TN	BELLSOUTH	5EC	CRICKET COMMUNICATIONS	KNOXVILLE	1828 MIDPARK RD
TN	BELLSOUTH	5EC	CRICKET COMMUNICATIONS	MEMPHIS	5425 E RAINES RD
TN	BELLSOUTH	5E	CRICKET COMMUNICATIONS	NASHVILLE	770 MELROSE AVE
TN	BELLSOUTH	DS	MEMPHIS SMSA LIMITED PARTNERSHIP	MEMPHIS	201 COURT AVE
TN	BELLSOUTH	DS	METROCALL	NASHVILLE	830 FESSLERS PKY
TN	BELLSOUTH	CMC	NASHVILLE / CLARKSVILLE MSA LIMITED PARTNERSHIP	NASHVILLE	2627 BRICK CHURCH PIKE
TN	BELLSOUTH	DMH	NEXTEL	NASHVILLE	741 MELROSE AVE
TN	BELLSOUTH	DMS	SPRINT PCS	MEMPHIS	3087 MILLBRANCH RD
TN	BELLSOUTH	CMC	SPRINT PCS	NASHVILLE	735 MELROSE AVE
TN	BELLSOUTH	CMC	SPRINT PCS	NASHVILLE	735 MELROSE AVE

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
TN	BELLSOUTH	CMC	TELEPAK	MEMPHIS	2565 HORIZON LAKE DR
TN	BELLSOUTH	DMS	TRITEL COMMUNICATIONS	CHATTANOOGA	300 E M L KING BLVD
TN	BELLSOUTH	CMC	TRITEL COMMUNICATIONS	JACKSON	315 E COLLEGE ST
TN	BELLSOUTH	CMC	TRITEL COMMUNICATIONS	KNOXVILLE	3585 YORKMAN RD
TN	BELLSOUTH	CMC	TRITEL COMMUNICATIONS	KNOXVILLE	3585 WORKMAN RD
TN	BELLSOUTH	CMC	TRITEL COMMUNICATIONS	NASHVILLE	698 MELROSE AVE
TN	BELLSOUTH	CMC	US CELLULAR	CONCORD	707 CONCORD RD
TN	BELLSOUTH	CMC	US CELLULAR	KNOXVILLE	6525 ASHEVILLE WAY
TN	BELLSOUTH	AXT	VOICESTREAM	JACKSON	122 RADIO RD
TN	BELLSOUTH	DS	VOICESTREAM	MEMPHIS	3895 VANTECH DRIVE BLDG. D SUITE 7
TN	BELLSOUTH	CMC	VOICESTREAM	NASHVILLE	3800 EZELL RD
TN	BELLSOUTH	CMC	WOOD COMMUNICAITONS DBA CELLPAGE	UNION CITY	417 W REELFOOT AVE
TN	BELLSOUTH	CMC	YORKVILLE TELEPHONE COOPERATIVE	YORKVILLE	HWY 77
TX	VERIZON	CMC	ALLTEL	COPER COVE	5668 CIRCUIT
TX	VERIZON	5E	AT&T WIRELESS	AUSTIN	4400 STAGGERBRUSH RD
TX	VERIZON	CMC	AT&T WIRELESS	BRYAN	500 S WASHINGTON AVE
TX	VERIZON	5E	AT&T WIRELESS	DALLAS	4100 BRYAN ST
TX	VERIZON	CMC	AT&T WIRELESS	DALLAS	13733 NEUTRON RD
TX	VERIZON	CMC	AT&T WIRELESS	HOUSTON	1407 JEFFERSON ST
TX	VERIZON	CMC	AT&T WIRELESS	SHERMAN	STHWY 11
TX	VERIZON	CMC	AT&T WIRELESS	TEXARKANA	1700 ROSEWOOD- KENNEDY TWR #2
TX	VERIZON	CMC	AT&T WIRELESS	VICTORIA	202 W GOODWIN AVE
TX	VERIZON	CMC	COLEMAN COUNTY TELECOMMUNICATIONS	SANTA ANNA	215 N 2ND ST
TX	VERIZON	CMC	CT CUBE	SAN ANGELO	OLD CHRISTOVAL HWY & CO RD
TX	VERIZON	GT5	LINSHAW COMMUNICATIONS	SHERMAN	201 N WALNUT ST
TX	SBC	D12	METROCALL	FORT WORTH	4801 MATLOCK RD
TX	SBC	AXT	METROCALL	WICHITA FALLS	TANK FARM RD
TX	SBC	5E	METROTEL	DALLAS	2605 SHERMAN AV
TX	VERIZON	CMC	MID-TEX CELLULAR	BROWNWOOD	102 N GREENLEAF ST
TX	SBC	1AE	POKA LAMBRO PCS	ODESSA	301 W. 7TH
TX	SBC	DMH	S.M.R. SYSTEMS	HOUSTON	1310 RICHMOND
TX	VERIZON	CMC	SPRINT PCS	AUSTIN	10701 METRIC BLVD
TX	VERIZON	DMS	SPRINT PCS	AUSTIN	10701 METRIC BLVD
TX	VERIZON	DMS	SPRINT PCS	DALLAS	4939 READING ST
TX	VERIZON	DS	SPRINT PCS	DALLAS	4939 READING ST
TX	VERIZON	CMC	SPRINT PCS	DENTON	.3 MI E/O HARTLEE FIELD RD & FM 428
TX	VERIZON	CMC	SPRINT PCS	FORT WORTH	300 INDUSTRIAL AVE
TX	VERIZON	DMX	SPRINT PCS	HOUSTON	15413 W VANTAGE PKY
TX	VERIZON	DMS	SPRINT PCS	LAREDO	201 W DEL MAR BLVD
TX	VERIZON	CMC	SPRINT PCS	MCALLEN	1400 E UPAS AVE
TX	VERIZON	DMS	SPRINT PCS	SAN ANTONIO	217 WARREN ST
TX	VERIZON	CMC	SPRINT PCS	SHERMAN	118 NORTHEAST ST
TX	SBC	DMH	STPCS JOINT VENTURE	EAGLE PASS	416 N MONROE ST
TX	SBC	5E	STPCS JOINT VENTURE	LAREDO	902 SAN EDUARDO
TX	SBC	DMH	TELETOUCH COMMUNICATIONS	ARLINGTON	312 W ABRAMS
TX	SBC	1AE	TELETOUCH COMMUNICATIONS	LONGVIEW	214 E WHALEY
TX	SBC	DMH	TELETOUCH COMMUNICATIONS	NACOGDOCHES	227 MIMS ST

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
TX	VERIZON	GT5	TELETOUCH COMMUNICATIONS	TEXARKANA	500 OLIVE ST
TX	VERIZON	GT5	US CELLULAR	DEL RIO	305 PECAN ST
TX	VERIZON	D12	VOICESTREAM	DALLAS	11830 WEBB CHAPEL RD
TX	VERIZON	CMC	WCS COMMUNICATIONS	SAN ANGELO	320 W 26TH ST
TX	VERIZON	CMC	WESTERN WIRELESS	SAN ANGELO	2800 ARMSTRONG ST
TX	VERIZON	GT5	WESTERN WIRELESS	WESLACO	521 S MISSOURI AVE
UT	QWEST	CMC	AT&T WIRELESS	LAYTON	1370 N MAIN
UT	QWEST	CMC	AT&T WIRELESS	OGDEN	2510 WASHINGTON BLVD
UT	QWEST	CMC	AT&T WIRELESS	PROVO	1150 N 1750 E
UT	QWEST	CMC	AT&T WIRELESS	SALT LAKE CITY	3100 KENNEDY DR
UT	QWEST	5EC	LEAP WIRELESS INTL	WEST VALLEY CITY	2322 PRESIDENTS DR
UT	QWEST	5ES	SPRINT PCS	SALT LAKE CITY	S ORANGE @ BLDG C
UT	QWEST	DMS100	VOICESTREAM	SALT LAKE CITY	1497 S 700 WEST ST
VA	VERIZON	DS	ALLTEL	CULPEPER	700 US AVE
VA	VERIZON	CMC	ALLTEL	DANVILLE	OLD MT CROSS RD
VA	VERIZON	CMC	ALLTEL	EMPORIA	I 95
VA	VERIZON	CMC	ALLTEL	GLOUCESTER	100 FT N/O STHWY 606 & STHWY 615
VA	VERIZON	CMC	ALLTEL	LYNCHBURG	3506 MAYFLOWER DR
VA	VERIZON	CMC	ALLTEL	NORTON	EAGLE KNOB
VA	VERIZON	D6E	ALLTEL	RICHMOND	2501 GOODES BRIDGE
VA	VERIZON	CMC	APPALACHIAN CELLULAR GENERAL PARTNERSHIP	ROANOKE	1ST & CHURCH ST
VA	VERIZON	AXT	AT&T WIRELESS	ARLINGTON	900 S WALTER REED DR
VA	VERIZON	5E	AT&T WIRELESS	CULPEPER	614 BRANDY RD
VA	VERIZON	DS	CFW CELLULAR	STAUNTON	123 W FREDERICK AVE
VA	VERIZON	DS	NEXTEL	FREDERICKSBURG	418 HUDGINS RD
VA	VERIZON	DS	NEXTEL	RICHMOND	2800 LAUREL BROOK DR
VA	VERIZON	5E	SPRINT PCS	FAIRFAX	2720-D PROSPERITY AVE
VA	VERIZON	DS	SPRINT PCS	STAUNTON	123 W FREDERICK AVE
VA	VERIZON	5E	TRITON PCS	FREDERICKSBURG	@ JEFFERSON DAVIS HWY & INDUSTRIAL DR
VA	VERIZON	5E	TRITON PCS	GLENALLEN	5500 COX RD
VA	VERIZON	AXT	TRITON PCS	LYNCHBURG	700-06 CHURCH ST
VA	VERIZON	AXT	TRITON PCS	NORFOLK	1194 AZALEA GARDEN RD
VA	VERIZON	AXT	TRITON PCS	NORFOLK	1194 AZALEA GARDEN RD
VA	VERIZON	5E	TRITON PCS	ROANOKE	2830 NICHOLAS AVE NE
VA	VERIZON	AXT	TRITON PCS	WINCHESTER	831 GREENWOOD RD
VA	VERIZON	DS	US CELLULAR	ROANOKE	9 KIRK ST SW
VA	VERIZON	CMC	VIRGINIA CELLULAR	STAUNTON	1762 ENGLEWOOD DR
VA	VERIZON	5E	VIRGINIA PCS ALLIANCE	BLACKSBURG	1309 S MAIN
VA	VERIZON	DS	VIRGINIA PCS ALLIANCE	BLAIRS	460 CARTER LODGE RD
VA	VERIZON	D12	VIRGINIA PCS ALLIANCE	LEXINGTON	102 E WASHINGTON ST
VA	VERIZON	CMC	VIRGINIA PCS ALLIANCE	NORFOLK	945 NORFOLK SQ
VA	VERIZON	CMC	VIRGINIA PCS ALLIANCE	RICHMOND	2413 OWNBY LN
VA	VERIZON	DS	VIRGINIA PCS ALLIANCE	TROUTVILLE	75 SUNSET AVE
VA	VERIZON	DS	VIRGINIA PCS ALLIANCE	WINCHESTER	3074 MIDDLE RD
VA	VERIZON	DS	VOICESTREAM	FAIRFAX	2720-D PROSPERITY AVE
VA	VERIZON	DMT	WEBLINK WIRELESS	FAIRFAX	10431 LEE HWY
VA	VERIZON	5E	WEBLINK WIRELESS	NORFOLK	120 BUTE ST
VT	VERIZON	5E	LINCOLN COMMUNICATIONS	SOUTH BURLINGTON	2026 WILLISTON RD
VT	VERIZON	CMC	PERSONAL COMMUNICATION NETWORK	SOUTH BURLINGTON	3 BALDWIN AVE

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
VT	VERIZON	DX6	RURAL CELLULAR CORP	COLCHESTER	1100 MOUNTAIN VIEW DR
WA	VERIZON	CMC	AMERICELL	EAST WENATCHEE	2.5 MI NW/O CLARK RD SW ON LOWER BADGER MOUNTAIN RD
WA	QWEST	CMC	ARCH WIRELESS HOLDINGS	SEATTLE	2001 6TH AVE
WA	QWEST	CMC	ARCH WIRELESS HOLDINGS	SEATTLE	2001 6TH AVE
WA	QWEST	CMC	AT&T WIRELESS	MILLWOOD	10906 E MARIETTA AVE
WA	QWEST	CMC	AT&T WIRELESS	SEATTLE	15008 8TH AVE SW
WA	QWEST	CMC	AT&T WIRELESS	SEATTLE	15008 8TH AVE SW
WA	QWEST	CMC	AT&T WIRELESS	TACOMA	757 S FAWCETT AVE
WA	QWEST	CMC	AT&T WIRELESS	YAKIMA	208 W YAKIMA AVE
WA	VERIZON	CMC	AT&T WIRELESS	EVERETT	(PRIMARY CENTER)
WA	QWEST	CMC	LEAP WIRELESS INTL	SPOKANE	157 S HOWARD ST
WA	QWEST	CMC	NEXTEL	SEATTLE	2001 6TH AVE
WA	QWEST	CMC	NEXTEL	TACOMA	616 61ST AVE NE
WA	QWEST	CMC	NEXTEL	TUMWATER	419 1/2 L47-00-45 L122-54-45 @ 5TH AVE S
WA	VERIZON	CMC	NEXTEL	EVERETT	(PRIMARY CENTER)
WA	QWEST	5ES	SPRINT PCS	REDMOND	12208 134 COURT NE
WA	QWEST	CMC	SPRINT PCS	SEATTLE	2001 6TH AVE
WA	QWEST	5ES	SPRINT PCS	SPOKANE	E 360 THIRD AVE
WA	QWEST	CMC	SPRINT PCS	VANCOUVER	1111 MAIN ST
WA	QWEST	5ES	SPRINT PCS	E REDMOND	12208 134 COURT N
WA	QWEST	CMC	US CELLULAR	YAKIMA	215 N 3RD AVE
WA	QWEST	DM5	VOICESTREAM	BOTHELL	19807 N CREEK PARKWAY
WA	VERIZON	DM5	VOICESTREAM	BOTHELL	19807 N CREEK PARKWAY
WI	VERIZON	CMC	AT&T WIRELESS	RHINELANDER	CTY TRK HWY G
WI	VERIZON	CMC	AT&T WIRELESS	WAUSAU	2700 STEWART AVE
WI	VERIZON	GT5	BUSINESS SERVICE CENTER	WAUSAU	607 WASHINGTON ST
WI	VERIZON	CMC	CENTURY TEL WIRELESS	DODGEVILLE	FIRE #3728 COHWY Z & CELL SITE
WI	VERIZON	CMC	EINSTEIN PCS	WAUSAU	221 SCOTT ST
WI	VERIZON	CMC	SPRINT PCS	APPLETON	890 S WESTLAND DR
WI	VERIZON	CMC	SPRINT PCS	NEW BERLIN	2937 S 166TH ST
WI	VERIZON	CMC	US CELLULAR	BROOKFIELD	3545 N 124TH ST
WI	VERIZON	CMC	US CELLULAR	MADISON	4417 HELGESEN DR
WI	VERIZON	CMC	US CELLULAR	MAUSTON	SE1/4 & SE1/4,SEC 13, TWSP 15N, R
WI	VERIZON	CMC	US CELLULAR	NEW BERLIN	2885 S 166TH ST
WI	VERIZON	CMC	US CELLULAR	PLOVER	6292 5TH ST
WI	VERIZON	CMC	US CELLULAR	WAUSAU	2220 GRAND AVE
WI	VERIZON	CMC	VOICESTREAM	WAUKESHA	N19 W24075 RIVERWOOD DR
WV	VERIZON	DS	ALLTEL	HUNTINGTON	2924 OVERLOOK DR
WV	VERIZON	DS	ALLTEL	LOGAN	WARD ROCK
WV	VERIZON	DS	ALLTEL	PARKERSBURG	WV STATE ROUTE 2
WV	VERIZON	DS	AT&T WIRELESS	CULLODEN	2975 BENEDICT RD
WV	VERIZON	5E	AT&T WIRELESS	LOGAN	AHN 763 WARD ROCK MOUNTAIN
WV	VERIZON	DS	AT&T WIRELESS	MORGANTOWN	250 SCOTT AVE
WV	VERIZON	DS	AT&T WIRELESS	PARKERSBURG	RT10,BX 169,RIDGE RD
WV	VERIZON	DM5	AT&T WIRELESS	WEST UNION	313 LOUISE AVE
WV	VERIZON	DS	HIGHLAND CELLULAR	BECKLEY	550 N EISENHOWER DR
WV	VERIZON	CMC	NEXTEL	CLARKSBURG	7 ARMORY RD

Wireless Switches Serving BOC Rate Centers					
State	**BOC Region**	**Type**	**CLEC**	**City**	**Street**
WV	VERIZON	5E	RONDALL LAWRENCE DBA COMMUNICATION CENTER/PAGE 1	MORGANTOWN	145 FAYETTE ST
WV	VERIZON	CMC	VIRGINIA PCS ALLIANCE	CHARLESTON	500 SUMMERS ST
WV	VERIZON	CMC	VIRGINIA PCS ALLIANCE	CHARLESTON	301 VIRGINIA ST E
WV	VERIZON	CMC	VIRGINIA PCS ALLIANCE	HUNTINGTON	1122 7TH AVE
WY	QWEST	CMC	WESTERN WIRELESS	CASPER	334 S WOLCOTT ST
WY	QWEST	CMC	WESTERN WIRELESS	CHEYENNE	6621 SPEER RD @ S33R67WT13
Source: Telcordia, *January 2002 LERG.*					

APPENDIX G.
COMPETITIVE COLLOCATION PROVIDERS IN THE TOP 50 MSAS

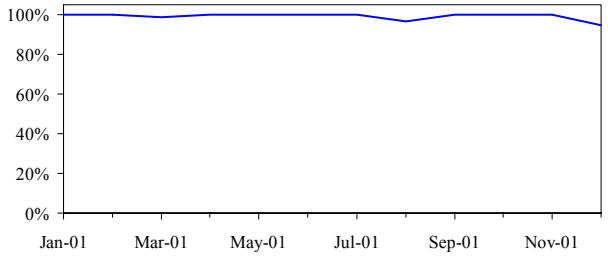
MSA *(rank)*	**Competitive Collocation Provider**
Los Angeles-Long Beach, CA PMSA *(1)*	E-COLO.com [3], Switch & Data, Telehouse America, TelX, Gateway Colo, , Equinix, IX2 Networks [3], Universal Access, ClearBlue
New York, NY PMSA *(2)*	AccessColo [2], E-COLO.com [2], Switch & Data [2], Telehouse America [3], ColoSolutions, Equinix, TelX, The Raco Group, Universal Access [3], Fiber Connect, ClearBlue
Chicago, IL PMSA *(3)*	E-COLO.com, Switch & Data, Layerone, Core Location, Gateway Colo*, Equinix, Universal Access [2], ClearBlue
Philadelphia, PA-NJ PMSA *(4)*	E-COLO.com, Switch & Data
Washington, DC-MD-VA-WV PMSA *(5)*	AccessColo*, E-COLO.com [4], Switch & Data [2], ColoSafe[one operational, and one planned], Gateway Colo*, Equinix, Universal Access
Detroit, MI PMSA *(6)*	E-COLO.com, Switch & Data, ColoVault
Houston, TX PMSA *(7)*	E-COLO.com, MetroNexus
Atlanta, GA MSA *(8)*	E-COLO.com, MetroNexus, Switch & Data, Core Location, Gateway Colo*, Collocation Solutions*, 56 Marietta, Universal Access
Dallas, TX PMSA *(9)*	E-COLO.com [2], Switch & Data, Layerone, Colo4-Dallas, Gateway Colo*, Collocation Solutions, Equinix, TeleTeam [2], Universal Access, ClearBlue
Boston, MA-NH PMSA *(10)*	AccessColo*, COLO.com, E-COLO.com, Switch & Data, Gateway Colo*, Universal Access
Riverside-San Bernardino, CA PMSA *(11)*	Digital Internet Services Corp., Linkline Communications, Swiftcomm*, Time Warner Telecom
Phoenix-Mesa, AZ MSA *(12)*	E-COLO.com, Switch & Data, ColoVault, Universal Access
San Diego, CA MSA *(13)*	E-COLO.com, MetroNexus, Switch & Data
Minneapolis-St. Paul, MN-WI MSA *(14)*	E-COLO.com, Switch & Data, Axon Telecom, ColoVault*
Orange County, CA PMSA *(15)*	COLO.com, E-COLO.com, The Next Millennium
Nassau-Suffolk, NY PMSA *(16)*	
St. Louis, MO-IL MSA *(17)*	E-COLO.com, Switch & Data, Axon Telecom, ColoVault*
Baltimore, MD PMSA *(18)*	E-COLO.com, ColoCo,
Oakland, CA PMSA *(19)*	E-COLO.com [2], ClearBlue
Seattle-Bellevue-Everett, WA PMSA *(20)*	E-COLO.com [at least one site], MetroNexus, Switch & Data, Gateway Colo, Apollo Communications, Tres, Universal Access
Tampa-St. Petersburg-Clearwater, FL MSA *(21)*	E-COLO.com, Switch & Data, ColoSolutions
Pittsburgh, PA MSA *(22)*	E-COLO.com, Switch & Data, ColoSolutions
Cleveland-Lorain-Elyria, OH PMSA *(23)*	E-COLO.com, Switch & Data, ColoSolutions
Miami, FL PMSA *(24)*	COLO.com, E-COLO.com, Switch & Data, Layerone, Gateway Colo, Universal Access
Denver, CO PMSA *(25)*	E-COLO.com, Switch & Data, Gateway Colo*, @lightspeed, Universal Access

MSA *(rank)*	**Competitive Collocation Provider**
Newark, NJ PMSA *(26)*	E-COLO.com, Gateway Colo
Portland-Vancouver, OR-WA PMSA *(27)*	E-COLO.com, Switch & Data, Universal Access, ClearBlue
San Francisco, CA PMSA *(28)*	E-COLO.com, Wave Exchange, UPNetworks, Universal Access, ClearBlue
Kansas City, MO-KS MSA *(29)*	E-COLO.com, Switch & Data, Axon Telecom [2]
San Jose, CA PMSA *(30)*	Wave Exchange, Universal Access, E-COLO.com [at least one site], Switch & Data, Telehouse America, Core Location, Gateway Colo*, Equinix
Cincinnati, OH-KY-IN PMSA *(31)*	E-COLO.com
FortWorth-Arlington, TX PMSA *(32)*	E-COLO.com ClearBlue
Orlando, FL MSA *(33)*	E-COLO.com [2], ColoSolutions [2], ClearBlue
Sacramento, CA PMSA *(34)*	E-COLO.com, Switch & Data, Wave Exchange*
San Antonio, TX MSA *(35)*	E-COLO.com, ColoSolutions
Las Vegas, NV-AZ MSA *(36)*	E-COLO.com, Collocation Solutions
Fort Lauderdale, FL PMSA *(37)*	E-COLO.com, Dialtone Internet, Valueweb
Indianapolis, IN MSA *(38)*	E-COLO.com, Switch & Data
Norfolk-Virginia Beach-Newport News, VA-NC MSA *(39)*	E-COLO.com
Milwaukee-Waukesha, WI PMSA *(40)*	E-COLO.com
Columbus, OH MSA *(41)*	E-COLO.com, Switch & Data, ColoSolutions, ColoVault*
Charlotte-Gastonia-Rock Hill, NC-SC MSA *(42)*	E-COLO.com, Switch & Data, ColoSolutions, ColoVault*
Bergen-Passaic, NJ PMSA *(43)*	
New Orleans, LA MSA *(44)*	E-COLO.com
Salt Lake City-Ogden, UT MSA *(45)*	E-COLO.com [2], Switch & Data
Greensboro-Winston Salem-High Point, NC MSA *(46)*	E-COLO.com
Nashville, TN MSA *(47)*	E-COLO.com, Switch & Data
Austin-San Marcos, TX MSA *(48)*	E-COLO.com, Collocation Solutions
Buffalo-Niagara Falls, NY MSA *(49)*	E-COLO.com, The Raco Group
Middlesex-Somerset-Hunterdon, NJ PMSA *(50)*	Advanticom
Sources: See Appendix M.	

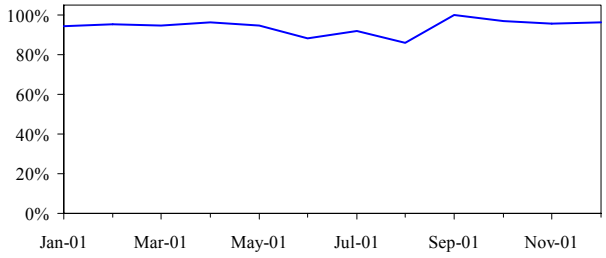
APPENDIX H. HOT-CUT PERFORMANCE

Verizon Hot-Cut Performance: Percent Completed On Time*

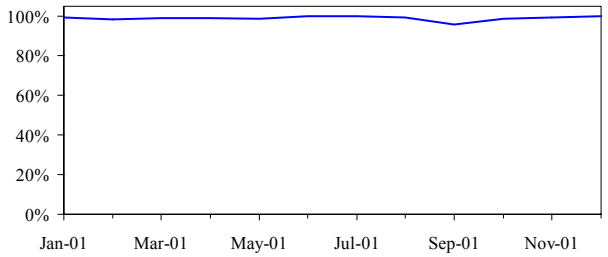
Connecticut



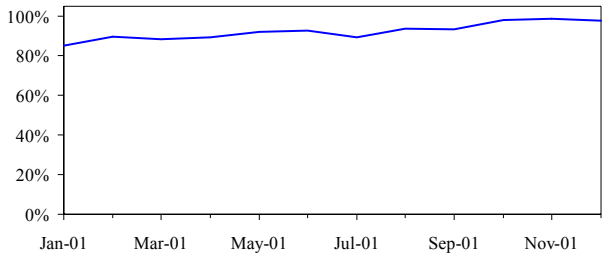
Delaware



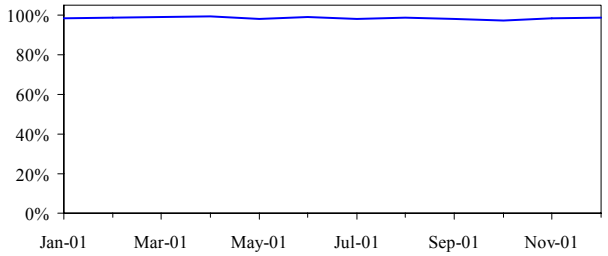
Maine



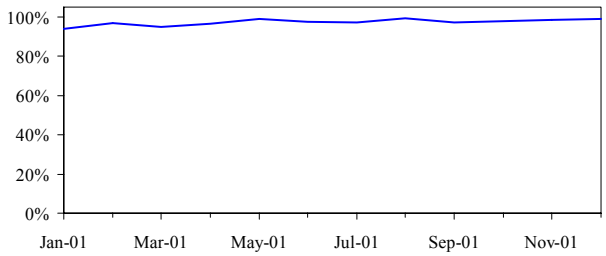
Maryland



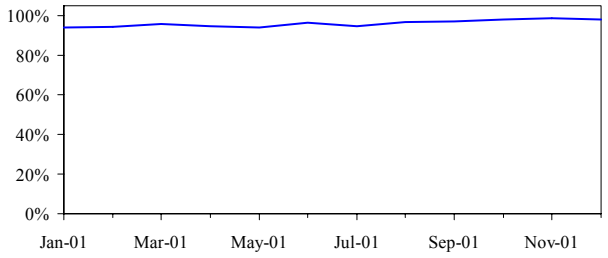
Massachusetts



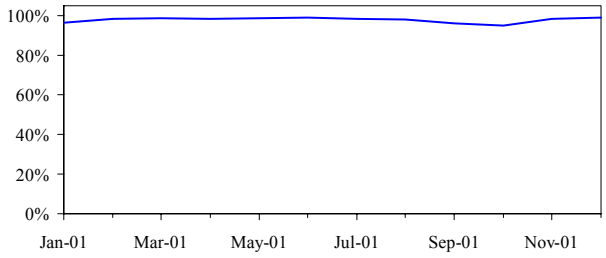
New Hampshire



New Jersey

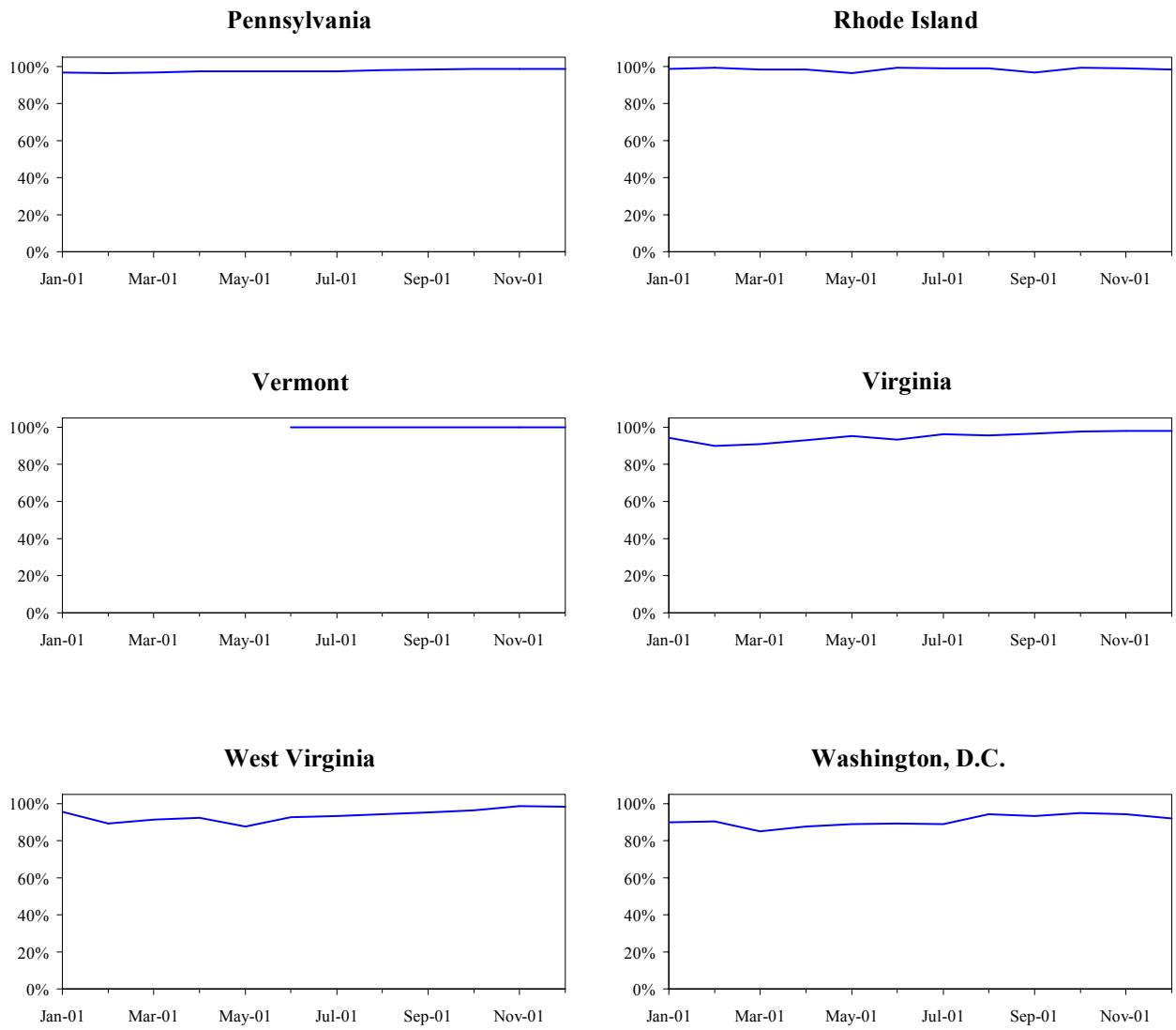


New York



* Data for all Verizon States represent the results for performance measurement PR 9-01 and do not include results for the former GTE service area.

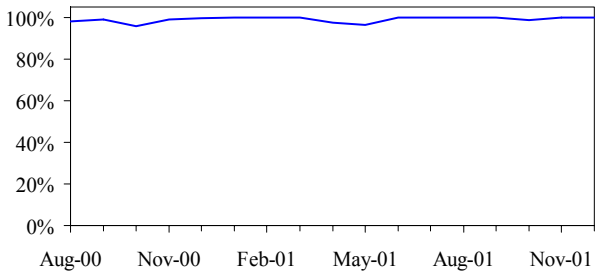
Verizon Hot-Cut Performance: Percent Completed On Time*



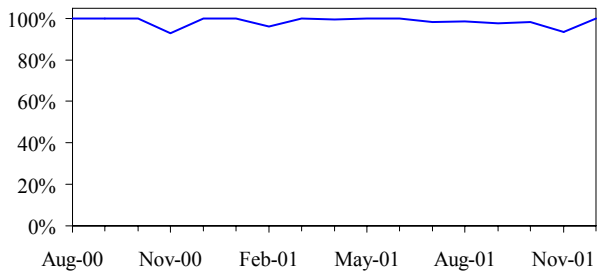
* Data for all Verizon States represent the results for performance measurement PR 9-01 and do not include results for the former GTE service area.

Southwestern Bell Telephone Hot-Cut Performance: Percent Completed On Time

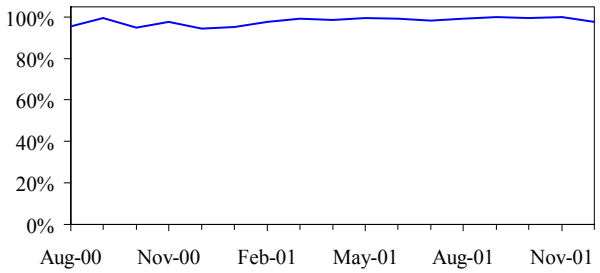
Arkansas



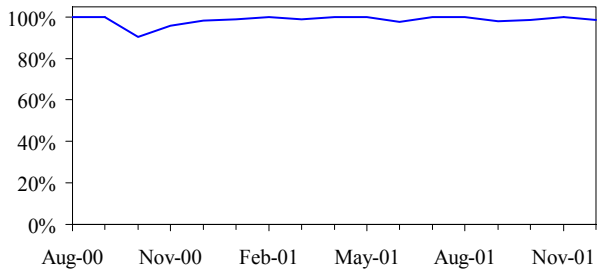
Kansas



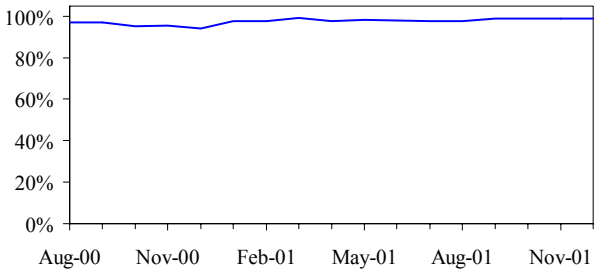
Missouri



Oklahoma

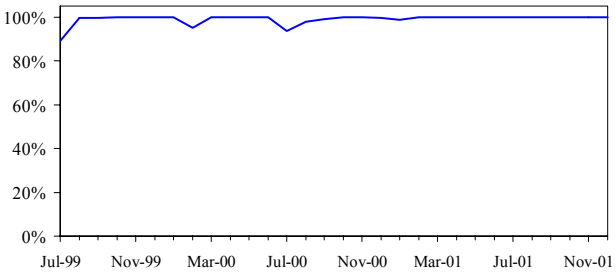


Texas

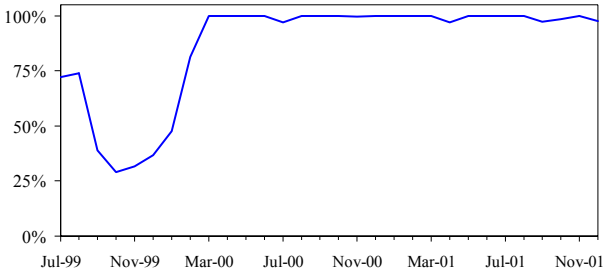


Pacific Bell & Nevada Bell Hot-Cut Performance: Percent Completed On Time**

California



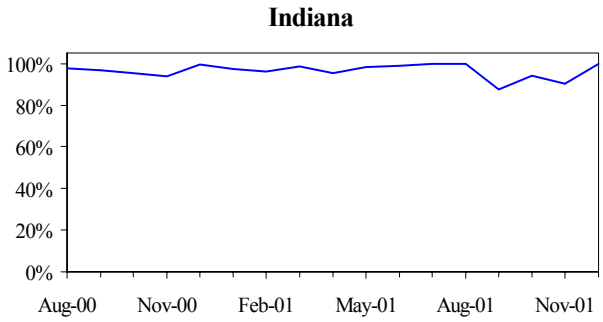
Nevada

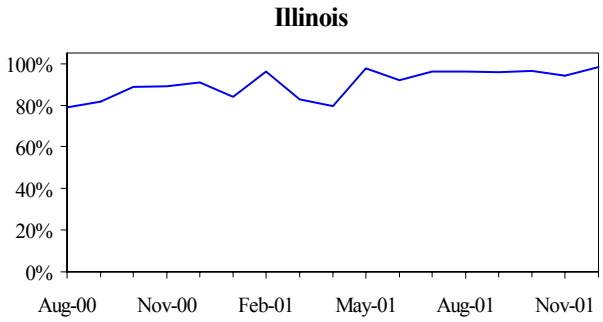


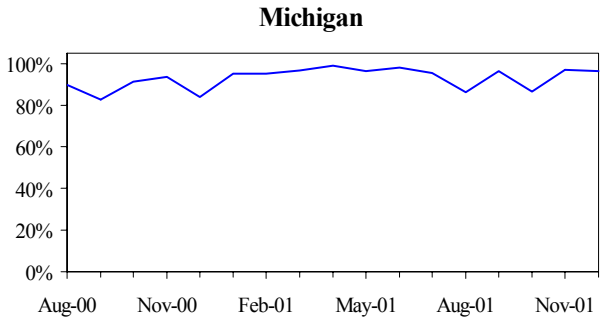
* Data for SWBT States represent results for performance measurement 114.1.

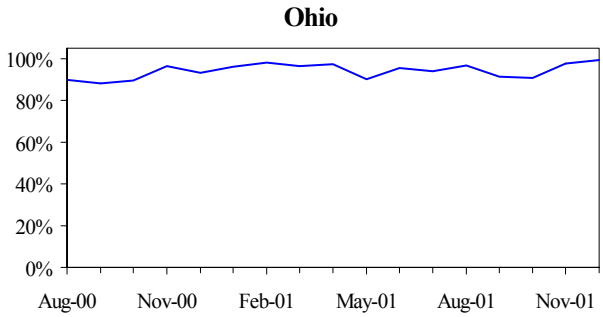
** Data for Pacific Bell and Nevada Bell represent results for performance measurement 9.

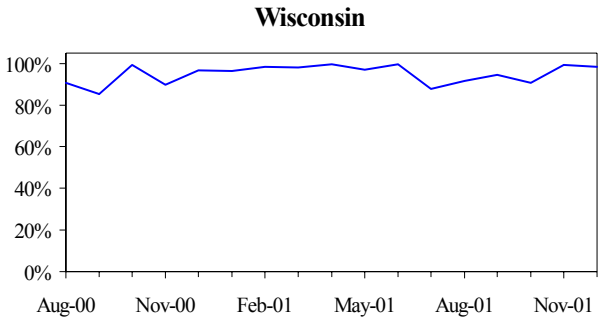
Ameritech Hot-Cut Performance: Percent Completed On Time*





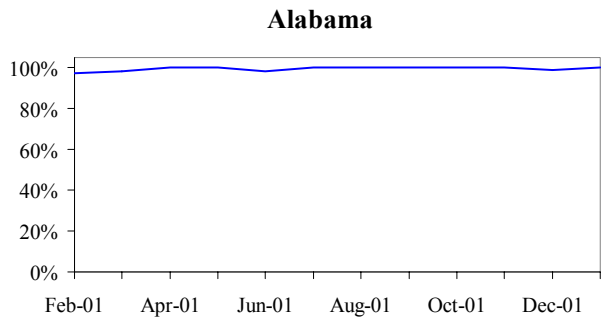


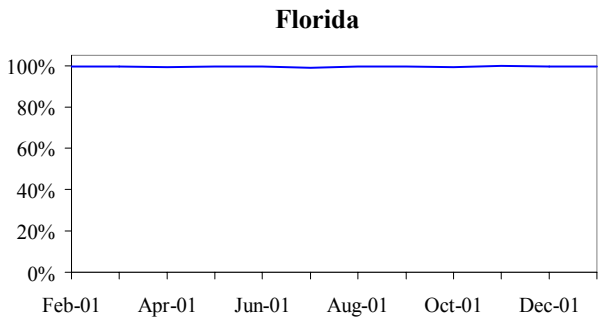


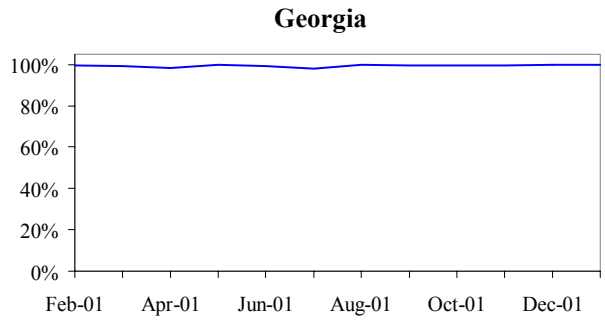


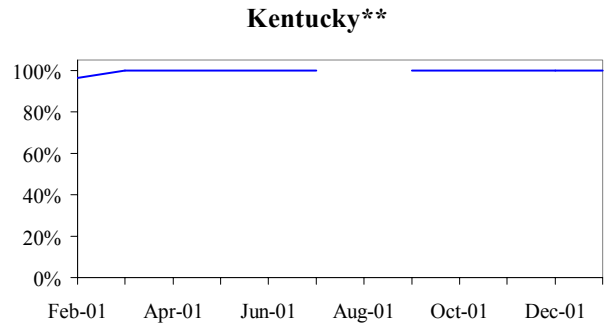
* Data for Ameritech States represent results for performance measurement 114.1.

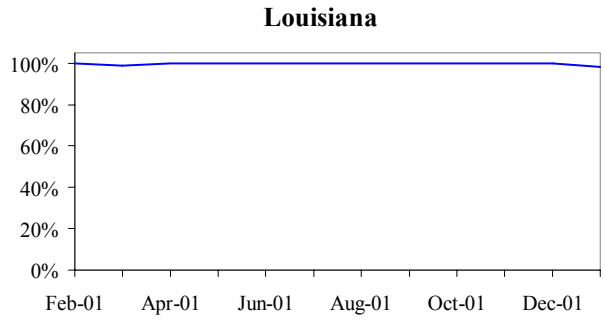
BellSouth Hot-Cut Performance: Percent Completed On Time*

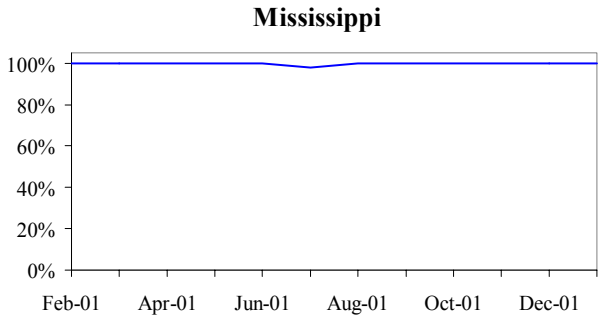






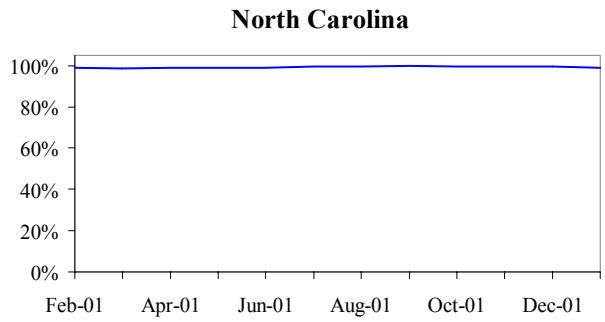


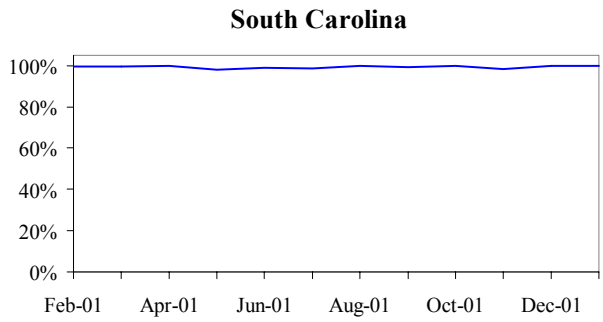


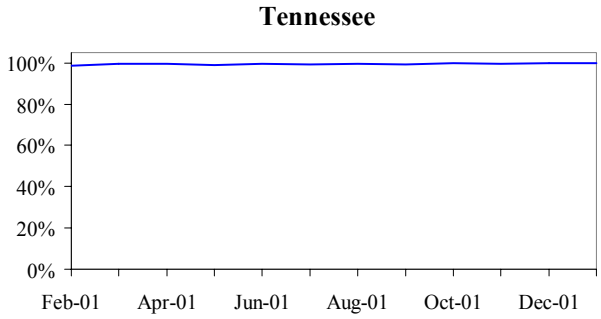


* Data for BellSouth States represent results for performance measurement P-7.
** There was no hot-cut activity for BellSouth in Kentucky in August 2001.

BellSouth Hot-Cut Performance: Percent Completed On Time*



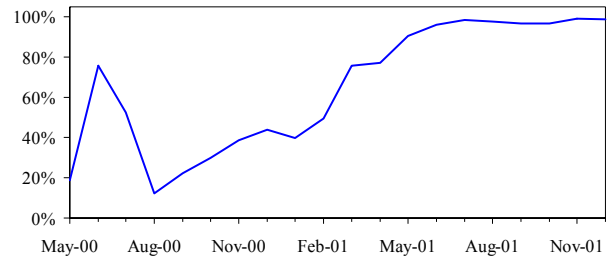




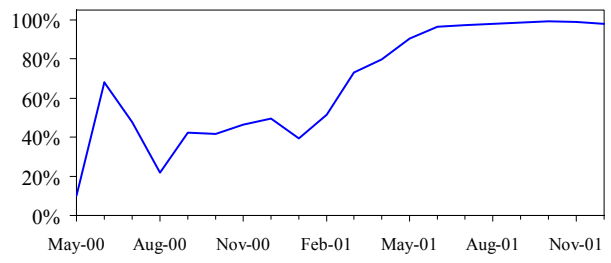
* Data for BellSouth States represent the results for performance measurement P-7.

Qwest Hot-Cut Performance: Percent Completed On Time*

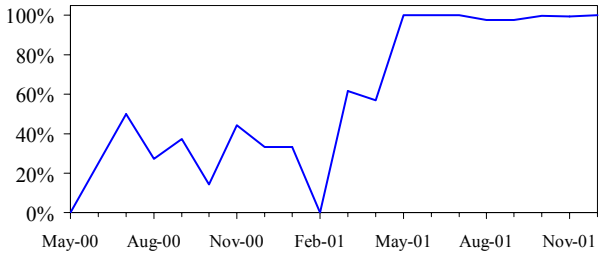
Arizona



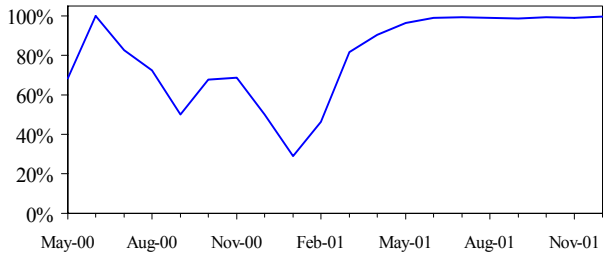
Colorado



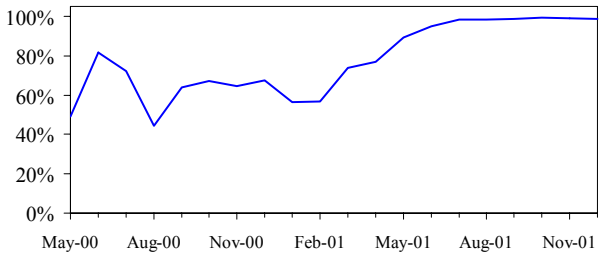
Idaho



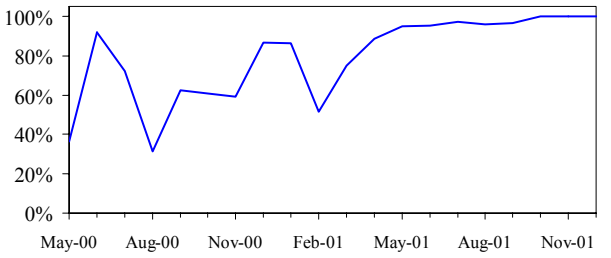
Iowa



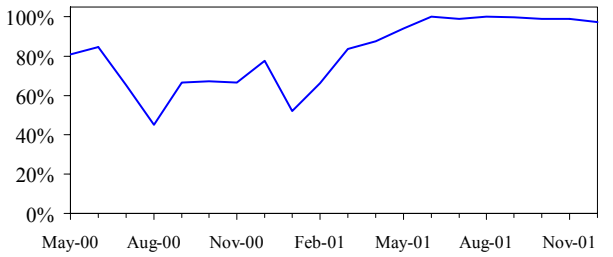
Minnesota



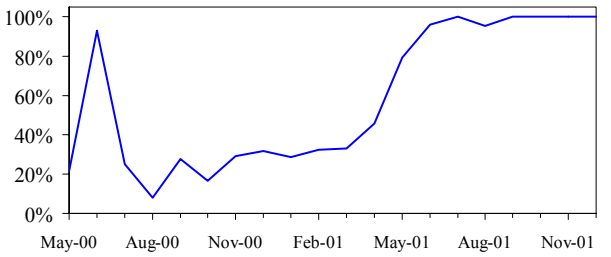
Montana



Nebraska

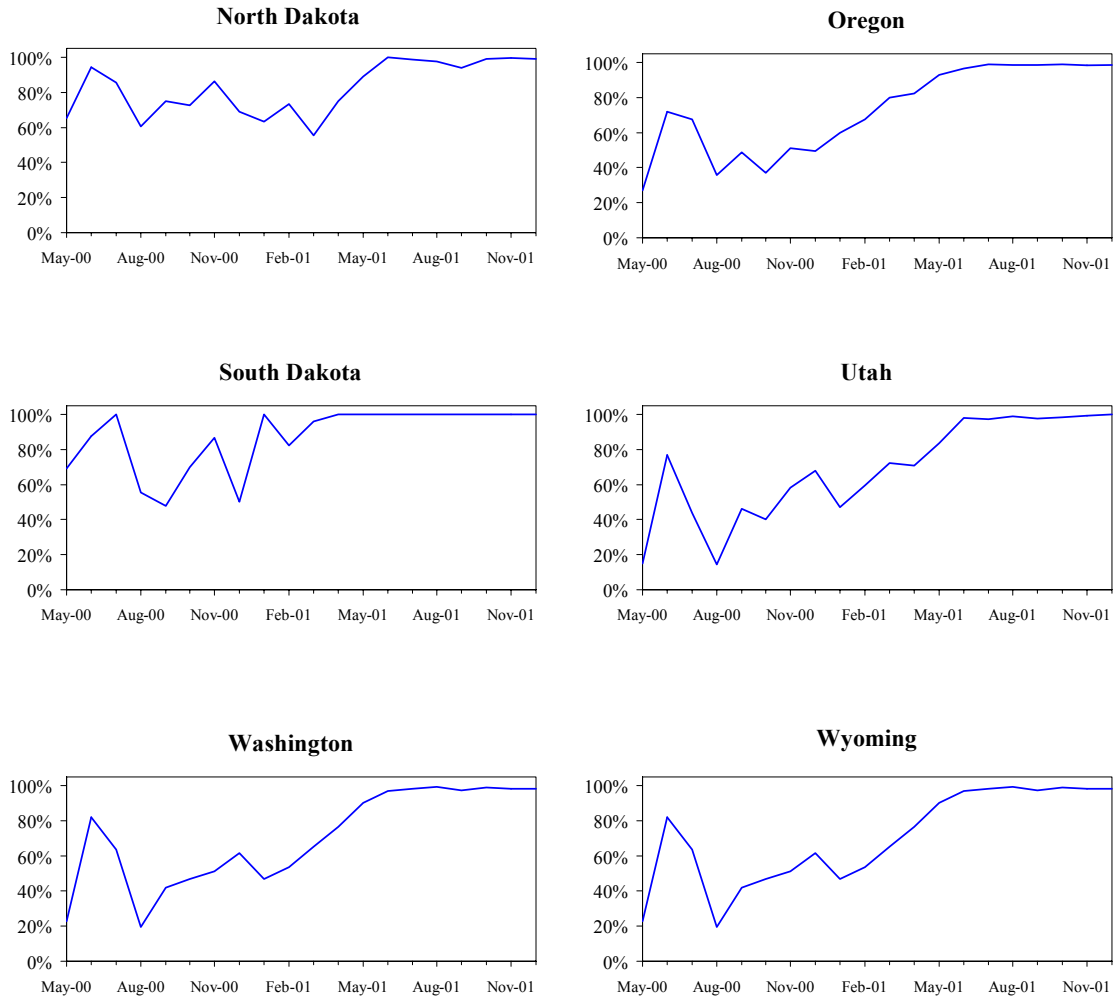


New Mexico



* Data for Qwest States represent the combined results for performance measurements OP-13A – Analog and OP-13A – Other.

Qwest Hot-Cut Performance: Percent Completed On Time*



* Data for Qwest States represent the combined results for performance measurements OP-13A – Analog and OP-13A – Other.

APPENDIX I. CLECS PROVIDING ATM AND FRAME RELAY

CLEC	***Service:*** **Market**
Adelphia	***ATM/Frame Relay:*** Albany, Buffalo, New York, Rome, and Syracuse, NY; Allentown, Altoona, Bethlehem, Easton, Erie, Harrisburg, Lancaster, Philadelphia, Pittsburgh, Reading, Scranton, State College, Wilkes-Barre, and York, PA; Boston, MA Chicago, IL; Cincinnati, Cleveland, and Columbus, OH; Fresno, Los Angeles, and San Francisco, CA; Hartford, CT; Kansas City, MO; Little Rock, AR; Wichita, KS; Albany, Atlanta and Savannah, GA; Austin, Dallas, Houston, and San Antonio, TX; Baltimore and Hagerstown, MD; Baton Rouge, Lafayette, New Orleans, and Shreveport, LA; Birmingham and Mobile AL; Boise, ID; Camden, Parsippany, and Piscataway, NJ; Charleston, Columbia, and Greenville, SC; Charlotte and Raleigh, NC; Charlottesville, Danville, Fairfax, Harrisonburg, Richmond, Roanoke, and Winchester, VA; Denver, CO; Des Moines, IA; Detroit, MI; Fort Lauderdale, Jacksonville, Miami, Orlando, and Tampa, FL; Fort Wayne and Indianapolis, IN; Jackson, MS; Knoxville and Nashville, TN; Montpellier, VT; Phoenix, AZ; Portland, OR; Seattle and Vancouver, WA; Washington, DC; Wilmington, DE
Allegiance	***ATM/Frame Relay:*** Detroit, MI; Chicago, Naperville, Northbrook, Oak Brook, Schaumburg, and Winnetka, IL; Brookfield, Madison, and Oshkosh, WI; White Plains, NY. ***ATM:*** Baltimore, MD; Boston, MA; New York, NY; Newark and Rutherford, NJ; Philadelphia and Pittsburgh, PA; Washington, DC; Austin, Dallas, Fort Worth, Houston, and San Antonio, TX; Bridgeton, Kirkwood, and St. Charles, MO; Oakland, Sacramento, San Diego, and San Francisco, CA; Atlanta, GA; Cincinnati, OH; Denver, CO; Fort Lauderdale, Miami, Saint Petersburg, and Tampa, FL; Minneapolis and Saint Paul, MN; Seattle, WA
ALLTEL	***ATM:*** Augusta and Savannah, GA; Bentonville, Cabot, Conway, Fayetteville, Fort Smith, Jacksonville, Little Rock, North Little Rock, Rogers, Russellville, Sherwood, and Springdale, AR; Cary, Chapel Hill, Durham, Greensboro, Raleigh, and Winston-Salem, NC; Charleston, Columbia, Greenville, and Spartanburg, SC; Clarion, PA; Fremont, Grand Island, Kearney, and Omaha, NE; Gainesville, Jacksonville, Mandarin, and Tallahassee, FL; Hampton, Newport News, Norfolk, Portsmouth, Richmond, and Virginia Beach, VA; Montgomery, AL; Springfield, MO; Toledo, OH
Arbros	***ATM/Frame Relay:*** Washington, DC; Boston, MA; Baltimore and Landover, MD; Newark, NJ; New York, NY; Harrisburg, Philadelphia and Pittsburgh, PA; Alexandria, Arlington, Norfolk, and Richmond, VA
AT&T	***ATM/Frame Relay:*** Baltimore, MD; Newark, NJ; Manhattan, NY; Providence, RI; Alexandria, VA; Austin, Dallas, and Houston, TX; Chicago, IL; Cincinnati, and Columbus, OH; Detroit, MI; Hartford, CT; Indianapolis, IN; Anaheim, San Diego, and San Francisco, CA; Atlanta, GA; Birmingham, AL; Charlotte, NC; Knoxville and Nashville, TN; Denver, CO; Fort Lauderdale, Miami, and Tampa, FL; Waukesha, WI; Minneapolis and Saint Paul, MN; Omaha, NE; Seattle, WA

CLEC	***Service:*** **Market**
ATG	***ATM/Frame Relay:*** Reno, NV; Bend, Klamath Falls, and Portland, OR; Bellingham and Yakima, WA. ***ATM:*** Carson City and Sparks, NV; Corte Madera, Ignacio, Larkspur, Mill Valley, Napa, Novato, Petaluma, Rohnert Park, San Rafael, and Santa Rosa, CA; Greenwich, Norwalk, and Stamford, CT; Albany, Ashland, Astoria, Baker City, Corvallis, Cottage Grove, Dallas, Eugene, Grant's Pass, Independence, Kaiser, Lake Oswego, Madras, Medford, Milwaukie, Monmouth, Newport, Oregon City, Pendleton, Prineville, Redmond, Roseburg, Salem, Springfield, Sunriver, and Woodburn, OR; Atwater, Bellevue, Bothell, Cherry, Duwamish, East Seattle, Elliot, Everett, Fife, Lacy, Lakewood, Marysville, Mount Vernon, Olympia, Puyallup, Tacoma, and Walla Walla, WA; Bethesda, Chevy Chase, Cockeysville, Frederick, Gaithersburg, Germantown, Hagerstown, Owings Mill, Rockville, and Towson, MD; Broomfield, Fort Collins, Lafayette, Longmont, Louisville, Loveland, and North Glenn, CO; Ewing, Hamilton Township, Lawrence, Plainsboro, Princeton, Trenton, and West Windsor, NJ; Centerville, Chantilly, Fairfax, Herndon, Manassas, and Reston, VA; Farmingdale, Floral Park, Freeport, Garden City, Hempstead, Hicksville, Levittown, Lynbrook, Mamaroneck, Massapequa, Mineola, Mount Vernon, New Rochelle, Port Chester, Uniondale, Wantagh, Westbury, White Plains, and Yonkers, NY
Bay Ring Communications	***ATM/Frame Relay:*** Dover, ME; Hampton and Portsmouth, NH
Birch Telecom	***ATM:*** Abilene, Amarillo, Austin, Beaumont, Corpus Christi, Dallas, El Paso, Fort Worth, Houston, Longview/Marshall, Lubbock, Midland/Odessa, San Antonio, Tyler, Waco, and Wichita Falls, TX; Kansas City, St. Joseph, and St. Louis, MO; Topeka and Wichita, KS; Oklahoma City and Tulsa, OK; Atlanta and Augusta, GA; Mobile and Montgomery, AL; Knoxville and Nashville, TN
Broadslate	***ATM:*** Allentown and Harrisburg, PA; Richmond and Tidewater, VA; Cincinnati and Dayton, OH
Broadview	***ATM:*** Boston, MA; Albany, Buffalo, Long Island City, New York, and Syracuse NY; Horsham and Philadelphia, PA
BTI	***ATM/Frame Relay:*** Atlanta, GA; Charlotte and New Bern, NC; Miami, FL. ***Frame Relay:*** Philadelphia, PA; Norfolk and Richmond, VA; Dallas, TX; Chattanooga, Greensboro, Greenville, and Rocky Mount, NC; Charleston, Columbia, and Greenville, SC; Fort Lauderdale, Jacksonville, Orlando, Tallahassee, and Tampa, FL; Knoxville and Nashville, TN; Louisville, KY; Philadelphia, PA; Washington, DC
Buckeye Tel.	***ATM/Frame Relay:*** Bowling Green, Fremont, Sandusky, and Toledo, OH
Choice One	***ATM/ Frame Relay:*** Springfield and Worcester, MA; Portsmouth and Manchester, NH; Albany, Buffalo, Rochester and Syracuse, NY; Allentown, Harrisburg, Pittsburgh, and Scranton/Wilkes-Barre, PA; Providence, RI; Akron, Columbus, and Dayton, OH; Appleton, Green Bay, Madison, Milwaukee, Oshkosh, WI; Bloomington, Elkhart, Evansville, Fort Wayne, Indianapolis, and South Bend, IN; Ann Arbor, Grand Rapids, Kalamazoo, Lansing, MI; Hartford and New Haven, CT; Rockford, IL
Coast to Coast	***ATM:*** Ann Arbor, Detroit, Flint, Grand Rapids, Lansing, Livonia, Pontiac, Port Huron, and Troy, MI
Comcast Business Communications	***Frame Relay:*** Anne Arundel County and Prince George's County, MD; Alexandria and Prince William County, VA
CoreComm (ATX)	***ATM/Frame Relay:*** Camden, NJ; Philadelphia, PA; Chicago, IL; Cleveland and Columbus, OH
Cox	***ATM/Frame Relay:*** Providence and West Warwick, RI; Hampton Roads and Roanoke, VA; Hartford and Meriden, CT; Las Vegas, NV; Oklahoma City, OK; Orange County, San Diego, and Santa Barbara, CA; Atlanta, GA; New Orleans, LA; Gainesville and Pensacola, FL; Omaha, NE; Phoenix and Tucson, AZ

CLEC	***Service:*** **Market**
CTC	***ATM/Frame Relay:*** Boston, Braintree, Danvers, Lexington, Manchester, Marlboro, North Attleboro, Springfield, Waltham and West Springfield, MA; Bangor and Portland, ME; Bedford, NH; Albany, Elmsford, Melville, Nanuet, New York, Syosset and Yorktown Heights, NY; Burlington, VT; Fairfield and Meriden, CT
CTC Telcom	***ATM/Frame Relay:*** Barron, Chetek, and Rice Lake, WI
CTSI	***ATM:*** Harrisburg and Wilkes-Barre, PA
Digital Teleport	***ATM/Frame Relay:*** Little Rock, AR; Oklahoma City, OK; St. Louis, MO; Memphis, TN; . ***Frame Relay****:* Jefferson City and Kansas City, MO
e.spire Communications	***ATM/Frame Relay:*** Albuquerque, NM; Amarillo, Dallas, El Paso, and Fort Worth, TX; Columbus, GA; Baltimore, MD; Baton Rouge and New Orleans, LA; Birmingham, Mobile, and Montgomery, AL; Charleston, Columbia, and Greenville, SC; Fort Lauderdale, Fort Myers, Jacksonville, Miami, Orlando, Tallahassee, and Tampa, FL; Jackson, MS; Las Vegas, NV; Lexington and Louisville, KY; Little Rock, AR; Philadelphia, PA; Phoenix and Tucson, AZ; Richmond, VA. ***ATM****:* San Antonio, TX
Electric Lightwave	***ATM/Frame Relay:*** Washington, DC; Austin, Dallas and Houston, TX; Chicago, IL; Cleveland, OH; Elk Grove, Fair Oaks, Los Angeles, Roseville, Sacramento, San Diego, San Francisco, and Wabash, CA; Las Vegas, NV; Aloha, Beaverton, Eugene, Gresham, Hillsboro, Milwaukee, Portland, Salem, Tigard, and Wilsonville, OR; Atlanta, GA; Bellevue, Bothell, Kirkland, Olympia, Orchards, Redmond, Renton, Seattle, Spokane, Tacoma, and Vancouver, WA; Boise, ID; Chandler, Deer Valley, Holbrook, Kingman, Phoenix, Scottsdale, and Tempe, AZ; Denver, CO; Murray, Ogden, Orem, Provo, Salt Lake City, and Tremonton, UT; New York, NY, Philadelphia, PA
Eschelon Telecom	***ATM:*** Denver, CO; Saint Paul, MN
Fairpoint	***ATM:*** Augusta, ME; Bellingham, Olympia, and Yakima, WA; Bloomsburg, Erie, Hazelton, Lock Haven, and Williamsport, PA; Dallas, TX; East Greenbush, New York, and Yakim, NY; Lebanon and Manchester, NH; Morgantown, WV; Springfield, MA
Fibernet Telecom	***ATM/Frame Relay:*** New York, NY; Chicago, IL; Los Angeles, CA
Fidelity Communication Services	***ATM:*** Rolla, MO
Florida Digital Network	***ATM:*** Clearwater, Cocoa Beach, Daytona Beach, De Land, Fort Lauderdale, Gainesville, Jacksonville, Jacksonville Beach, Jupiter, Lake Mary, Melbourne, Miami, Orlando, Oviedo, Port Orange, Saint Augustine, Saint Petersburg, Sanford, Seminole, Stuart, Tampa, Titusville, West Palm Beach, and Winter Park, FL
Focal	***ATM:*** Washington, DC; Boston, MA; Baltimore, MD; Camden, Jersey City, New Brunswick, Newark and Rochelle Park, NJ; New York and White Plains, NY; Philadelphia, PA; Arlington and Northern Virginia, VA; Chicago, IL; Cleveland, OH; Dallas, Fort Worth, and Houston, TX; Detroit, MI; Los Angeles, Oakland, Orange County, San Diego, San Francisco, and San Jose, CA; St. Louis, MO; Atlanta, GA; Minneapolis, MN; Seattle, WA
General Communications	***ATM/Frame Relay:*** Anchorage, Fairbanks and Juneau, AK
Global Crossing	***ATM/Frame Relay:*** Washington, DC; Boston, MA; Baltimore, MD; New York and Rochester, NY; Philadelphia and Pittsburgh, PA; Akron, Cincinnati, and Cleveland, OH; Chicago, IL; Dallas, TX; Kansas City, MO; Los Angeles, San Diego, and San Francisco, CA; Milwaukee, WI; Atlanta, GA; Denver, CO; Milwaukee, WI; Minneapolis, MN; Tampa, FL; Portland, OR; Seattle, WA. ***Frame Relay*****:** Columbus, OH; El Paso, TX; Springfield, MO. ***ATM****:* Indianapolis, IN; Topeka, KS; Sacramento, CA; Phoenix, AZ

CLEC	***Service:*** **Market**
Global NAPs	***ATM:*** Atlanta, GA; Baltimore, MD; Brattleboro, VT; Manchester, NH; Manhattan and Poughkeepsie, NY; Miami and Orlando, FL; New Haven, CT; Newark, DE; Newark, NJ; Philadelphia, PA; Providence, RI; Quincy and Springfield, MA; Reston, VA
Globalcom	***ATM/Frame Relay:*** New York, NY; Chicago, IL; Dallas, TX; Los Angeles, CA; Atlanta, GA
Grande Comm.	***ATM/Frame Relay:*** San Marcos, TX.
HickoryTech	***Frame Relay:*** New Richland, Saint Peter, and Waseca, MN
ICG Communications	***ATM:*** Anaheim, Burbank, Inglewood, Los Angeles, Ontario, and Oxnard, CA
Integra Telecom	***ATM:*** Baxter, Minneapolis, and Prior Lake, MN; Beaverton, Hillsboro, Portland, and Salem, OR; Kent, WA; Salt Lake City, UT
IP Communications	***ATM:*** Abilene, Amarillo, Austin, Beaumont, Corpus Christi, Dallas, El Paso, Fort Worth, Galveston, Houston, Laredo, Longview, Lubbock, McAllen/Harlingen/Brownsville, Midland/Odessa, Orange, Port Arthur, San Antonio, Temple, Texas City, Tyler, Victoria, Waco, and Wichita Falls, TX; Dodge City, Kansas City, Topeka, and Wichita, KS; Kansas City, Springfield, and St. Louis, MO; Lawton, Norman, Oklahoma City, and Tulsa, OK
ITC^DeltaCom	***ATM/Frame Relay:*** Austin, Beaumont, Bryan, Dallas, Houston, Longview, and San Antonio, TX; Little Rock and Pine Bluff, AR; Albany, Athens, Atlanta, Augusta, Columbus, Gainesville, Hartwell, La Grange, Macon, Newnan, Rome, Savannah, Valdosta, and West Point, GA; Alexander City, Anniston, Arab, Birmingham, Dothan, Gadsden, Huntsville, Mobile, Montgomery, Opelika, and Tuscaloosa, AL; Asheville, Charlotte, Concord, Fayetteville, Greensboro, High Point, Jacksonville, Jefferson, Laurinburg, Lexington, Raleigh, Rocky Mount, Wilmington, and Winston-Salem, NC; Baton Rouge, Lafayette, Lake Charles, Monroe, New Orleans, Shreveport, and West Monroe, LA; Beaufort, Charleston, Columbia, Florence, Greenville, Hilton Head Island, Myrtle Beach, Orangeburg, Spartanburg, and Sumter, SC; Bradenton, Cocoa, Daytona Beach, Fort Lauderdale, Fort Myers, Gainesville, Hollywood, Jacksonville, Melbourne, Ocala, Orlando, Panama City, Pensacola, Port Charlotte, Saint Augustine, Sarasota, Tallahassee, Tampa, Vero Beach, and West Palm Beach, FL; Chattanooga, Memphis, and Nashville, TN; Gulfport, Jackson, Hattiesburg, Meridian, and Vicksburg, MS
KMC Telecom	***ATM/Frame Relay:*** Akron, Dayton, and Toledo, OH; Ann Arbor and Lansing, MI; Corpus Christi and Longview, TX; Augusta and Savannah, GA; Baton Rouge, Monroe, and Shreveport, LA; Charleston, Columbia, and Spartanburg, SC; Chattanooga, TN; Daytona Beach, Fort Meyers, Greater Pinellas, Pensacola, Sarasota, and Tallahassee, FL; Eden Prairie, MN; Fayetteville, Greensboro, and Winston-Salem, NC; Fort Wayne, IN; Hampton Roads and Roanoke, VA; Huntsville and Montgomery, AL; Madison, WI; Topeka, KS
Knology Broadband	***ATM:*** Augusta, Columbus, Evans, Forest Hills, Grovetown, Martinez, Midland, and West Point, GA; Charleston, Ladson, Mount Pleasant, and Summerville, SC; Harvest, Huntsville, Lanett, Madison, Maxwell Air Force Base, Montgomery, Pike Road, Prattville, Redstone Arsenal, and Valley, AL; Lynn Haven, Panama City, and Panama City Beach, FL
LecStar Communications	***ATM:*** Atlanta, GA
Lightship Telecom	***Frame Relay:*** Waltham and Worcester, MA; Portland, ME; Atlantic County and Mercer County, NJ; Buck County, Chester County and Montgomery, PA; Burlington, VT; Manchester, NH
Lightyear	***ATM/Frame Relay:*** Boston, MA; Baltimore, MD; Newark, NJ; New York, NY; Anaheim, San Diego, and San Francisco, CA; Chicago, IL; Cincinnati and Cleveland, OH; Dallas and Houston, TX; Detroit, MI; Indianapolis, IN; Kansas City and St. Louis, MO; Atlanta, GA; Denver, CO; Jacksonville and Miami, FL; Lexington and Louisville, KY; Phoenix, AZ; Seattle, WA

CLEC	***Service:*** **Market**
Log On America	***Frame Relay:*** Portland, ME; Providence, RI
Logix	***ATM/Frame Relay:*** Amarillo, TX; Tulsa, OK. ***ATM:*** Austin, Corpus Christi, Dallas, Houston, Lubbock, San Antonio and Wichita Falls, TX; Kansas City and Wichita, KS; Little Rock, AR; Oklahoma City, OK; St. Louis and Springfield, MO
Madison River	***ATM:*** Atlanta, GA; Biloxi, MS; Chapel Hill, Durham, Greensboro, and Winston-Salem, NC; Dallas and Houston, TX; New Orleans, LA; Pensacola, FL; Peoria, IL
McLeodUSA	***ATM/Frame Relay:*** Aberdeen, Canton, Centerville, Harrisburg, Madison, Pierre, Rapid City, Sioux Falls, Tea, Viborg, and Watertown, SD; Albuquerque, NM; Ames, Boone, Burlington, Cedar Rapids, Charles City, Clinton, Council Bluffs, Davenport, Decorah, Des Moines, Dubuque, Iowa City, Marshall Town, Mason City, Ottumwa, Sioux City, Spencer, Storm Lake, and Waterloo, IA; Appleton, Burke, Eau Claire, Green Bay, Janesville, Madison, Milwaukee, Oshkosh, Racine, and Sheboygan, WI; Bartonville, Belleville, Bloomington, Champaign, Chicago, Chicago (North), Chicago (South) Collinsville, Danville, Decatur, East Peoria, Effingham, Kankakee, Mattoon, Naperville, Pekin, Peoria, Peoria Heights, Quincy, Springfield, and Sterling, IL; Bellevue, Richland, Seattle, Spokane, and Tukwila, WA; Bismarck, Fargo, and Grand Forks, ND; Bloomington Township, Center Township, Evansville, Fishers, Indianapolis, Marion, Merrillville, South Bend, and Terre Haute, IN; Boise, ID; Boulder, Canon City, Colorado Springs, Denver, Ft. Collins, Greeley, Pueblo, and Sterling, CO; Cape Girardeau, Joplin, Kansas City, Springfield, and St. Louis, MO; Cleveland, Columbus, Dayton, Steubenville, Youngstown, and Zanesville, OH; Eugene, Portland, and Salem, OR; Marshall, Minneapolis, St. Cloud, St. Paul, and Winona, MN; Omaha, NE; Phoenix, and Tucson, AZ; Provo, Salt Lake City, and Taylorsville, UT
Mid-Maine	***Frame Relay:*** Auburn, Augusta, Bangor, Brewer, Cumberland, Ellsworth, Lewiston, Lincoln Counties, Portland, Sagadahoc, Waterville and York, ME
Mid-Rivers	***Frame Relay:*** Fairview, Glendive, Miles City, Sidney, Sidney, Terry, and Wibaux, MT; East Fairview, ND
MFN	***ATM/Frame Relay:*** Washington, DC; Wilmington, DE; Bedford, Boston, Cambridge, Lexington, Medford, Netwon, Waltham, Wellesley and Woburn, MA; Bethesda, Chevy Chase, College Park, Rockville and Silver Spring, MD; Garden City, Morristown, New Brunswick, Newark, Paramus, Parsippany, Piscataway, Princeton and Whippany, NJ; Brookhaven, Hauppage, Long Island, New York, Nyack, Shirley and White Plains, NY; Bala Cynwyd, King of Prussia, Malvern, Paoli, Philadelphia and Radnor, PA; Alexandria, Arlington, Fairfax, McLean, Reston, Tyson's Corner and Vienna, VA; Alameda, Anaheim, Berkley, Brisbane, Burbank, Century City, Costa Mesa, Culver City, El Segundo, Glendale, Irvine, Long Beach, Los Angeles, Newport Beach, Oakland, Orange, San Francisco, San Jose, San Mateo, Santa Clara, Santa Monica, and Tustin, CA; Arlington, Dallas/Ft Worth, Galleria, Greenspoint, Houston, Irving, Las Colinas, and Richardson, TX; Arlington Heights, Chicago, Des Plaines, Downers Grove, Elk Grove Village, Franklin Park, Hinsdale, Hoffman Estates, Naperville, Oak Brook, Rosemont, and Schaumburg, IL; Atlanta, Burlington, Chamblee-Doraville, Fair Oaks, Marietta, Norcross, Northeast Cobb, Roswell-Alpharetta, Smyrna, and Vinings, GA; Bellevue, Kirkland, Redmond, Renton, and Seattle, WA; Bridgeport, New Haven, and Stamford, CT; Cleveland, OH; Denver, CO; Detroit, MI; Miami, FL; St. Louis, MO; Chandler, Glendale, Guadalupe, Paradise Valley, Phoenix, and Tempe, AZ
MP Telecom	***ATM:*** Superior, WI; Babbitt, Brainerd, Duluth, Ely, Eveleth, Grand Rapids, Hibbing, Hinckley, Minneapolis, Saint Cloud, Saint Paul, and Winona, MN
Mpower	***ATM:*** Ann Arbor and Detroit, MI; Austin, Dallas, Fort Worth, Houston, and San Antonio, TX; Chicago and Wheeling, IL; Cleveland and Columbus, OH; Las Vegas, NV; La Mesa, Long Beach, Los Angeles, Oakland, Ontario, Orange County, Palm Springs, Pomona, Sacramento, San Diego, San Fernando Valley, San Francisco, and San Jose, CA; Milwaukee, WI; Atlanta, GA; Boca Raton, Fort Lauderdale, Miami, and Tampa, FL; Memphis, TN

CLEC	*Service:* **Market**
NEON Optica	***ATM/Frame Relay:*** Washington, DC; Boston, Cambridge, Framingham, Lawrence, Northfield, Springfield and Worcester, MA; Baltimore, MD; Portland, ME; Dover, Keene, Manchester, Nashua and Portsmouth, NH; Newark, NJ; New York and White Plains, NY; Philadelphia, PA; Green Hill and Providence, RI; Bridgeport, Hartford, New Haven, New London, and Stamford, CT
Net2000	***ATM/Frame Relay:*** Baltimore, MD; Boston, MA; Long Island and New York, NY; Newark, NJ; Norfolk and Richmond, VA; Providence, RI; Washington, DC
New Edge Networks	***ATM/Frame Relay***: Abilene, Amarillo, Beaumont, Brownsville, Bryan, Copperas Cove, Corpus Christi, El Paso, Edinburg, Harlingen, Killeen, Laredo, Longview, Lubbock, Marshall, Mcallen, Midland, Mission, Nederland, Odessa, Pharr, Port Arthur, Sherman, Temple, Tyler, Victoria, Waco, and Wichita Falls, TX; Apple Valley, Arroyo Grande, Atascadero, Atwater, Auburn, Bakersfield, Banning, Baywood Park, Beaumont, Calimesa, Carlsbad, Carmel, Carpinteria, Chico, Davis, Eureka, Fairfield, Fallbrook, Fresno, Goleta, Grass Valley, Hanford, Hesperia, Lodi, Lompoc, Madera, Manteca, Marina, Marysville, Merced, Modesto, Monterey, Morro Bay, Murrieta, Oakdale, Oroville, Palm Desert, Palm Springs, Paradise, Paso Robles, Perris, Placerville, Porterville, Rancho Mirage, Red Bluff, Redding, Salinas, San Luis Obispo, San Marcos, Santa Barbara, Santa Maria, Seaside, Shingle Springs, Sonora, South Tahoe, Stockton, Sun City, Tracy, Tulare, Turlock, Vacaville, Valley Center, Victorville, Visalia, Vista, Watsonville, Woodland, Yuba City, and Yucaipa, CA; Bay City, Benton Harbor, Charlotte, East Lansing, Grand Haven, Holland, Hollister, Holt, Hudsonville, Jackson, Kalamazoo, Lansing, Midland, Niles, Okemos, Oshtemo, Port Huron, Portage, Saginaw, St. Joseph, and Traverse City, MI; Broken Arrow, Claremore, Lawton, Muskogee, Sapulpa, Tulsa, OK; Cabot, Fayetteville, Fort Smith, Jacksonville, Little Rock, Rogers, Russellville, and Springdale, AR; St. Joseph, MO; Carson City, Reno, Sparks, and Sun Valley, NV; De Pere, Green Bay, Madison, Neenah, Sheboygan, and Stoughton, WI; El Dorado, Hutchinson, Manhattan, Salina, and Wichita, KS; Findlay, Holland, Maumee, Middletown, Perrysburg, and Toledo, OH; Kokomo, Lafayette, Michigan City, Mishawaka, and South Bend, IN; Albany, Ashland, Bend, Corvallis, Eugene, Grants Pass, Keizer, Klamath Falls, Mcminnville, Medford, Milwaukie, Newberg, Redmond, Roseburg, Salem, and Springfield, OR; Albuquerque, Farmington, Las Cruces, and Santa Fe, NM; American Fork, Brigham City, Cedar City, Clearfield, Kaysville, Logan, Ogden, Orem, Pleasant Grove, Provo, Springville, and St. George, UT; Battle Ground, Bremerton, Camas, Federal Way, Graham, Kennewick, Lacey, Longview, Olympia, Pasco, Port Angeles, Port Townsend, Poulsbo, Pullman, Sequim, Shelton, Silverdale, Spokane, Tacoma, Vancouver, Walla Walla, and Yakima, WA; Ankeny, Cedar Rapids, Davenport, Des Moines, Iowa City, Sioux City, and Waterloo, IA; Anoka, Austin, Bemidji, Blaine, Brainerd, Duluth, Owatonna, Rochester, Shoreview, St. Cloud, and Winona, MN; Aspen, Breckinridge, Carbondale, Durango, Ft Collins, Grand Junction, Glenwood Springs, Greeley, Loveland, Pueblo, Steamboat Springs, and Table Mesa, CO; Augusta, GA; Billings, Bozeman, Butte, Great Falls, Helena, and Missoula, MT; Boise, Caldwell, Coeur D'Alene, Eagle, Idaho Falls, Hayden Lake, Lewiston, Meridian, Moscow, Nampa, Pocatello, Post Falls, Rexburg, and Twin Falls, ID; Bonita Springs, Cape Coral, Cocoa, Cocoa Beach, Daytona Beach, Deland, Destin, Fort Myers, Fort Pierce, Fort Walton Beach, Gainesville, Gulf Breeze, Hobe Sound, Hudson, Jensen Beach, Jupiter, Lakeland, Lehigh Acres, Lynn Haven, Marco Island, Melbourne, Milton, Naples, New Port Richey, New Smyrna Beach, Ocala, Ormond Beach, Pace, Panama City, Pensacola, Plant City, Port Charlotte, Port St. Lucie, Punta Gorda, Sebastian, St. Augustine, Stuart, Tallahassee, Tarpon Springs, Titusville, Vero Beach, and Winter Haven, FL; Bossier City and Shreveport, LA; Casper, Cheyenne, Gillette, Jackson, and Laramie, WY; Fargo, Grand Forks and West Fargo, ND; Flagstaff, Green Valley, Prescott, Sierra Vista, Tucson, and Yuma, AZ; Columbus, Fremont, Kearney, and Omaha, NE; Rapid City, Sioux Falls, SD
NAS	***ATM/Frame Relay:*** Washington, DC; Boston, MA; Baltimore, MD; New York, NY; Philadelphia and Pittsburgh, PA; Norfolk and Richmond, VA; Wilmington, DE

CLEC	***Service:*** **Market**
Northland	***Frame Relay:*** Auburn, Binghamton, Elmira, Ithaca, Rochester, Rome, Syracuse and Utica, NY
NewSouth Communications	***ATM/Frame Relay:*** Alpharetta, Atlanta, Augusta, Jonesboro, Macon, Peachtree City, and Savannah, GA; Charlotte, Greensboro, Hickory, Raleigh, and Winston-Salem, NC; Baton Rouge, Lafayette, and New Orleans, LA; Biloxi and Jackson, MS; Birmingham, Huntsville, Mobile, and Montgomery, AL; Charleston, Columbia, Greenville, and Myrtle Beach, SC; Chattanooga, Knoxville, Memphis, and Nashville, TN; Daytona Beach, Destin, Fort Myers, Jacksonville, Melbourne, Miami, Orlando, Panama City, Pensacola, Sarasota, Tallahassee, Tampa, and Winter Haven, FL; Lexington, and Louisville, KY
NTELOS	***ATM/Frame Relay:*** Harrisonburg, Lynchburg, Martinsville, New River Valley, Roanoke, Staunton and Waynesboro, VA; Charleston, Clarksburg, Fairmont, and Morgantown, WV. ***Frame Relay:*** Huntington, WV
NTS Comm.	***ATM/Frame Relay:*** Abilene, Amarillo, Dallas, Louisville, Lubbock, Midland/Odessa, Pampa, Plainview, San Angelo, San Antonio, and Wichita Falls, TX; Albuquerque, NM; Phoenix and Tucson, AZ
NuVox	***ATM:*** Akron, Cincinnati, Columbus, and Dayton, OH; Indianapolis, IN; Kansas City and Wichita, KS; Little Rock, AR; Oklahoma City and Tulsa, OK; St. Louis and Springfield, MO; Atlanta, GA; Burlington, Charlotte, Greensboro, Raleigh, Wilmington, and Winston-Salem, NC; Columbia, Greenville, and Spartanburg, SC; Knoxville, Memphis, and Nashville, TN; Fort Lauderdale, Jacksonville, and Miami, FL; Lexington and Louisville, KY
Pac-West	***ATM/Frame Relay:*** Bakersfield, Chico, Fresno, Los Angeles, Oakland, Palm Springs, Sacramento, Salinas, San Diego, San Jose, San Luis Obispo, Santa Barbara, and Stockton, CA; Las Vegas and Reno, NV; Denver, CO; Phoenix, AZ; Portland, OR; Seattle and Tukwila, WA; West Valley City, UT
Penn Telecom	***ATM/Frame Relay:*** Butler, Cranberry, Gibsonia, Perrysville, Pittsburgh and Sewickley, PA
Pine Tree Networks	***ATM/Frame Relay:*** Auburn, Lewiston, Portland, Scarborough, South Portland, Westbrook, and Windham, ME
Prospeed.Net	***ATM/Frame Relay:*** Lowell, MA
Reliant Energy	***ATM/Frame Relay:*** Austin, Dallas, and Houston, TX
Rio Communications	***ATM/Frame Relay:*** Bend, Eugene, and Medford, OR
TDS Metrocom	***ATM/Frame Relay:*** Appleton, Beloit, De pere, Fon Du Lac, Fox Valley, Green Bay, Janesville, Kenosha, Madison, Menasha, Milwaukee, Neenah, Oak Creek, Oshkosh, Racine, Stoughton, and Waukesha, WI; Northbrook, Rockford, and Waukegan, IL; Ann Arbor, Battle Creek, Farmington, Grand Haven, Grand Rapids, Holland, Jackson, Kalamazoo, Lansing, and Wayne, MI
Telergy	***ATM/Frame Relay:*** Boston, MA; Albany, Batavia, Binghamton, Buffalo, Glens Falls, Ithaca, New York, Oswego, Poughkeepsie, Rochester, Syracuse, Utica and Watertown, NY; Erie, PA
Teligent	***ATM:*** Cleveland, OH; Dallas and Houston, TX; Chicago, IL; Los Angeles, CA; Hartford, CT; Boston, MA; New York, NY; Philadelphia, PA; Phoenix, AZ; Washington, DC
Time Warner Telecom	***ATM:*** Jersey City, NJ; Albany, Binghamton, New York and Rochester, NY; Austin, Dallas, Houston, and San Antonio, TX; Cincinnati and Columbus, OH; Indianapolis, IN; Los Angeles and San Diego, CA; Milwaukee, WI; Los Angeles and San Diego, CA; Charlotte, Fayetteville, Greensboro, Raleigh-Durham, and Winston-Salem, NC; Chicago, IL; Columbia, SC; Honolulu, HI; Indianapolis, IN; Memphis, TN; Milwaukee, WI; Minneapolis, MN; Orlando and Tampa, FL
TXU Comm.	***ATM/Frame Relay:*** Austin, Corpus Christi, Dallas, Fort Worth, Huntsville, Nacogdoches, San Antonio, Temple, Tyler, and Waco, TX

CLEC	***Service:*** **Market**
US LEC	***ATM/Frame Relay:*** Philadelphia and Pittsburgh, PA; Norfolk and Richmond, VA; Atlanta, GA; Baltimore, MD; Birmingham and Mobile, AL; Charleston, SC; Charlotte, Greensboro, and Raleigh, NC; Chattanooga, Knoxville, Memphis, and Nashville, TN; Ft. Myers/Naples, Jacksonville, Miami, Orlando, and St. Petersburg, FL; Louisville, KY; New Orleans, LA;, ***ATM:*** Washington, DC; Virginia Beach, VA; Huntsville, Montgomery, and Tuscaloosa, AL; Hickory and Wilmington, NC; Johnson City, TN; Daytona Beach, Fredericksburg, Ft. Lauderdale, Gainesville, Tampa, and West Palm Beach, FL
Vanion	***ATM/Frame Relay:*** Colorado Springs, CO
WanTel	***ATM/Frame Relay:*** Roseburg, OR
Western Integrated Networks	***ATM/Frame Relay:*** Sacramento, CA
WinStar/IDT	***ATM/Frame Relay:*** Austin, Dallas, Fort Worth, Houston, Irving, San Antonio, and Sunnyvale, TX; Chicago, and Oak Brook, IL; Cincinnati, Cleveland, and Columbus, OH; Detroit, MI; Long Beach, Oakland, Sacramento, San Diego, and San Francisco, CA; Indianapolis, IN; Kansas City and St. Louis, MO; Las Vegas, NV; Milwaukee, WI; Oklahoma City and Tulsa, OK; Stamford, CT; Atlanta, GA; Baltimore, MD; Birmingham, AL; Boise, ID; Boston, MA; Charlotte, NC; Chattanooga, TN; Denver, CO; Flagstaff, Phoenix, and Tucson, AZ; Honolulu, HI; Jacksonville, Miami, Orlando, and Tampa, FL; Long Island and New York, NY; Newark, NJ; Norfolk, VA; Philadelphia, PA; Portland, OR; Minneapolis and Saint Paul, MN; Salt Lake City, UT; Seattle and Spokane, WA; Washington, DC. ***ATM****:* Los Angeles, CA
WorldCom	***ATM/Frame Relay:*** Washington, DC; Acton, Boston, Cambridge and Springfield, MA; Manchester and Nashua, NH; Laurel Springs, New Brunswick, and Newark, NJ; Buffalo, Garden City, Manhattan, New York, Westbury and White Plains, NY; King of Prussia, Philadelphia, and Pittsburgh, PA; Providence, RI; Reston, VA; Austin, Dallas, Houston, Irving, Richardson, and San Antonio, TX; Anaheim, Bakersfield, Fresno, Hayward, Irvine, Los Angeles, Rancho Cordova, Redwood City, Sacramento, San Diego, San Francisco, San Jose, Santa Clara, Stockton, Sunnyvale, and West Sacramento, CA; Bensenville, Chicago, and Elk Grove Village, IL; Cincinnati, Cleveland, and Toledo, OH; Detroit, Grand Rapids, Holland, Lansing, Southfield, Traverse City, and Zeeland, MI; Hartford and Stamford, CT; Indianapolis, IN; Kansas City, St. Louis and Springfield, MO; Oklahoma City, Stillwater, and Tulsa, OK; Little Rock, AR; Milwaukee, WI; Reno, NV; Albuquerque, NM; Baltimore, MD; Atlanta, Georgia, Jonesboro, and Marietta, GA; Aurora and Denver, CO; Jackson, MS; Kirkland and Seattle, WA; Knoxville and Memphis, TN; Maplewood, Minneapolis, and Saint Paul, MN; Miami, Orlando, Pompano Beach, and Tampa, FL; Morrisville, NC; Phoenix and Tucson, AZ; Portland, ME; Portland, OR; Salt Lake City, UT
XO	***ATM:*** Washington, DC; Boston, MA; Baltimore, MD; New York, NY; Philadelphia, PA; Akron, Cleveland and Columbus, OH; Austin, Dallas, Houston, San Antonio, TX; Chicago and Wood Dale, IL; Detroit, MI; Las Vegas, NV; Long Beach, Los Angeles, Roseville, Sacramento, San Diego, San Francisco, and Santa Ana, CA; St. Louis, MO; Atlanta, GA; Newark, NJ; Couer D-Alene, ID; Denver, CO; Miami and Tampa, FL; Minneapolis and Saint Paul, MN; Phoenix, AZ; Portland, OR; Salt Lake City, UT
Sources: See Appendix M.	

APPENDIX J. ADDITIONAL INFORMATION ON SOFTSWITCHES

Table 1. Features of Packet Switches/Softswitches vs. Traditional Circuit Switches	
Less fixed investment	• "Currently a Softswitch costs 40% to 45% less than an equivalent circuit switch." • "Originally envisioned to replace the monstrous Class 5 switches, softswitch platforms, by recent estimates, can be as much as 20 times smaller physically and 10 times cheaper." • CLEC DixieNet "found that for '10 percent' of the cost of traditional class 5 equipment, it could accomplish everything the firm intended to do with a switch through softswitch technology." • TelePacific Communications: "With the new convergent systems, we will be able to move into new service areas in weeks rather than months and add new services instantly rather than wait for months for vendors to enhance their switches."
Less expensive to operate and maintain	• "Carrying voice traffic on a packet platform saves up to 70% in operating costs, by [Banc of America] estimates." • "In addition to providing its customers with 10-25 percent cost reductions on local voice service, the new architecture provides CTC with higher margins – about 50 percent, versus the 10-30 percent margin afforded by CTC's former resale business." • "New business models based on the use of IP-oriented switches have an infinitely better value proposition for carriers. . . . They'll enable gross margins in the 60 percent-plus range and the ability to provide differentiated offerings." • DixieNet: "Other switch-related expenses – operation, maintenance, power, air conditioning, vendor support, training expenses, the cost of upgrades – all the costs were significantly lower with the softswitch system." • BroadRiver: "you get all the functionality of a basic class 5 type of switch in about a tenth the floor space for about a third the power. " • "A majority of the cost savings is derived from Sonus' dramatically smaller footprint. A circuit-switched network requires roughly 40 bays of equipment to simultaneously switch 50,000 calls. Sonus' packet-based platform is capable of switching the same number of calls with just two 19-inch racks of equipment."
Reduced peripheral equipment needs	• WorldCom: these new switches "provides input for IP, frame relay, ATM and voice all in a single box. We no longer have the need of putting out an IP router, an ATM switch, a frame relay switch and a voice switch. We do it all with the Multi-Services Switch. We can get a capital reduction because of a single box versus many boxes. And secondly, we get a trunking efficiency because now we only have to trunk back one box versus multiple boxes. That capital efficiency improvement is anywhere from 50-75%."
Increased scalability	• Allegiance: "The traditional switch with its time-space-time architecture is constrained. By deploying networks of media gateways which use standardized packets, new more-scalable networks are possible." • XO: Softswitch technology will allow XO to realize cost savings both in reduced equipment cost and reduced physical co-location space needs. Additionally, softswitches are expected to be quickly scaleable and have capabilities to launch new and enhanced services.
Increased flexibility for new services	• "Network intelligence in data networks offers carriers opportunities to offer differentiated, value-added enhanced services regardless of transport method." • Electric Lightwave: "Another key concept in the softswitch model is the ability to quickly provide new services and applications." • "Softswitches have greater flexibility. Legacy switches . . . contain a lot of proprietary code, whereas softswitches are easier to customize, enabling service providers to develop a wider variety of services and create new revenue streams."
High quality and reliability	• "With technologies currently available, it is possible to obtain quality voice calls over dedicated IP data networks." • "Because it is truly a Central Office in a single system, the FUSION 5000 passed all platform tests with flying colors in the first attempt and is approved for general deployment in service provider central offices throughout the country.") • "Now soft switches like that of Lucent can do between 144,000 and 5.25 million busy-hour call attempts, which is in the neighborhood of what a PSTN Class 5 can do." • BroadRiver: "'I would even say that the flexibility associated with this type of approach and technique gives you better survivability and reliability . . . The flexibility in terms of being able to dynamically switch and route traffic . . . is very open and very flexible,' Buttermore said. 'From a problem-resolution perspective, that's great.'"
Sources: See Appendix M.	

Table 2. The Emergence of Softswitches
• "At first used only for limited functions, in the past 12 months, softswitches have emerged as a possible alternative to the traditional class 5 devices at a number of small carriers." • "[I]t is fair to say that CLECs are about to graduate from Class 5 to a new generation of multiservice platforms-capable of carrying Internet protocol (IP) and circuit-switched traffic and consolidating functions that previously were supported in separate, standalone devices." • "Nobody doubts that the new switches will eventually overtake the current products. . . . 'The benefits that the new switches offer are so enticing that all carriers eventually will incorporate them in their networks.'" • "a CLEC today is unlikely to buy a Class 5 switch for a new buildout in a city . . . and will likely go with a softswitch solution." • "Only a few short years ago, any company that wanted to get into the facilities-based telecom market had only one choice: The heavy, expensive, inflexible and complex class 5 switch, the technology that has driven telecommunications for decades. . . . In the past few years, a new option has emerged. It's less expensive, more capable of adding new features, much smaller and easier to run: The humble softswitch."
Sources: See Appendix M.

Table 3. CLECs Deploying Softswitches	
CLEC	**Softswitch Deployment**
Allegiance	"announced today the official deployment of softswitch technology as a complement to its existing network infrastructure. . . . will now be able to utilize packet switching - in addition to the traditional circuit-switched technology already deployed in its 21 U.S. markets."
Broadriver	"using Cisco BTS 10200 softswitches and 2400 series integrated access devices (IADs) . . . launched VOIP-based converged voice, data and Internet service in Atlanta, Nashville and Orlando, and announced plans to expand service into Charlotte, Ft. Lauderdale, Miami and St. Petersburg by year's end." Tom Buttermore, CEO of Alpharetta, Ga-based competitive-communications firm BroadRiver Communications, said the advent of softswitches was the main reason his company was formed.
CTC Communications	"By introducing softswitch technology into its network, CTC will only lease T1 (1.5-megabit-per-second) loops from the incumbents, providing the intelligence for basic and enhanced voice services on its own." CTC "built its own facilities-based network, without installing any circuit switches, in 1999," but instead has used a combination of softswitches and ATM switches.
Global NAPs	Global NAPS has reportedly "gone so far as to deactivate four class 5 switches and deploy 35 softswitches, with 40 more in the pipeline as substitutes."
KMC Telecom	"Lucent's Softswitch IPO allows us to protect our switching infrastructure, save on real estate and reduce expenses without deploying costly circuit switches. . . . Now, we can deploy more telecom ports per square foot in a cost-effective manner."
Level 3	"By deploying Sonus' IP technologies into our network, we can deliver new services more rapidly and cost-effectively than we could before."
NewSouth Communications	"Tekelec's softswitch will provide long-distance service to NewSouth's customers in a nine-state coverage area."
Time Warner Telecom	"has deployed Sonus' packet telephony product family, including softswitches and media gateways, in eight markets throughout the United States . . . [and] is now delivering revenue-generating traffic over those networks."
USA Datanet	"selected the Sonus Packet Telephony suite, including the . . . PSX6000 SoftSwitch . . . as the platform for its next-generation VoIP network."
WorldCom	"WorldCom is taking the softswitch route and will deploy six of the devices by year-end [2001] . . . The new switches handle dial-up Internet traffic more cost-effectively than traditional Class 5 switches and have the capability to do voice over IP."
XO Communications	"plans to use the Sonus Networks platform, which includes . . . the PSX6000 SoftSwitch . . . The system is expected to act as an integral piece of XO's future network foundation, and will support a full range of local, long distance and Internet services to enterprise customers."
Kancharla	"VocalData Inc., a leader in the service delivery softswitch market, today announced that Kancharla Corp., a leading competitive local exchange carrier based in Huntsville, Ala., has purchased and deployed VocalData's award-winning VOISS (Voice Over IP Softswitch) solution."
Go-Comm	"VocalData Inc., the technology leader in the service delivery softswitch market, today announced that its award-winning Voice Over IP Softswitch (VOISS) solution has been deployed by Go-Comm, Inc. to provide voice over IP services in the Dallas area."
Sources: See Appendix M.	

Table 4. Major Softswitch Manufacturers		
Manufacturer	**Softswitch Product**	**Description**
Tachion	Fusion 5000	"will be used by our service provider customers as an alternative to traditional legacy central office composed of a class 5 voice switch surrounded by a number of data devices"; "collapses all the functions of the telephone company's central office into a box the size of a dorm room refrigerator"; It starts at around $270,000 compared to up to $2 million for a traditional Class 5 circuit switch.
Axtar Limited	OneSwitch	"supports both circuit switched interfaces such as TDM (E1 or T1) as well as IP (Ethernet) network interfaces," and is "a complete replacement for a CLASS 5 or CLASS 4 central office switch and can be implemented on its own as the primary (core) switch in a small network or as an edge switch for larger networks."
Santera Systems	SanteraOne	"an all-in-one C.O. solution that integrates the entire next-generation switching solution within a single chassis. This all-inclusive solution offers CLASS 4 and CLASS 5 functionality, ATM, IP, TDM, and frame relay switching, signaling, media gateways and controllers, and IP routing."; "costs about as much as what you'd spend on the switch room for a Class 5 switch"; "can be a replacement for either a legacy Class 4 or Class 5 circuit switch"
Uniphere Networks	BroadSoft	In March 2001, "completed Class 5 customer trials of its BroadSoft platform."
Cisco	BTS 10200	"has been in a GA [generally available] state for about eight months." It is "being upgraded to its second release of software. It supports a substantial number of business voice calling features, making it one of the front runner contenders for Class 5 replacement opportunities. It also implements all mandatory Class 5 and core network switch features, such as 911, LNP, DAOS, SS7, AIN application access, etc."
Sonus	GSX9000	"a carrier-class switch that is currently capable of supporting roughly 100,000 simultaneous calls while maintaining 99.999% reliability. One of the benefits of the GSX9000 is the small footprint needed for deployment; Sonus' GSX9000 reduces the required C.O. space by roughly 90% compared to traditional circuit-based switches. This greatly reduces the cost of deployment, which management estimates to be roughly 50% of per-port costs and 45% of operating costs."; "Our switch is ready for prime time because it's already widely in deployment, mostly in Class 4."
Convergent Networks	Integrated Convergence Switch (ICS)	Convergent Networks is "expected to have a softswitch with Class 5 functionality available this quarter.
Tacqua	Open Compact Exchange (OCX)	"Class 5 alternative switching system with integrated Softswitch functionality providing a clear migration path to next-generation packet-based networks."
Nortel	Communication Server 3000	"New venture capital startups with little or no telephony experience can use this solution as an entry-level vehicle to the Voice-over-IP market – supporting next generation line-side services."
Syndeo Corporation	The Syion 426	"The Syion 426 is a powerful second-generation, carrier-grade CLASS 5/Local Exchange softswitch"; "The Syion architecture was purpose-built for the delivery of regulatory (primary local exchange) services such as emergency/lifeline services, operator services, directory assistance, and lawful intercept." In February 2002, The Armstrong Group, which operates telephone and cable networks in the eastern U.S., announced that it would deploy the Syndeo Syion 426 softswitch platform in Western Pennsylvania.
Convedia Corporation	Convedia CMS-6000 Media Server	"The Convedia CMS-6000 Media Server has been designed and developed specifically to meet the challenges of delivering enhanced voice and video services over packet networks. . . . Convedia's modular hardware and software architecture lets you enter the enhanced services market quickly and affordably."

Table 4. Major Softswitch Manufacturers		
Manufacturer	**Softswitch Product**	**Description**
Gallery IP Telephony	CAssiopeia Softswitch Class 5 Alternative	"CAssiopeia Softswitch is the first ever standard-based Class-5 softswitch to demonstrate high-reliability, high capacity and performance, great flexibility and scalability, primary line architecture, revenue-generating services and features platform, and open standards interfaces. It enables service providers to reap the benefits of IP Telephony better, faster and cheaper."
MetaSwitch	Meta MetaSwitch VP3000	"The Meta MetaSwitch VP3000 Broadband Voice Platform Switch Platform . . . provides a full range of Class 5 services without a legacy Class 5 switch. . . This feature set makes the VP3000 ideal for service providers seeking to: generate additional revenue from data lines (such as DSL) by adding high-revenue voice; services; expand into new geographical regions, where backhauling long distances to their existing; facilities may be overly complex and expensive; add next-generation Class 5 services to their network, either replacing existing Class 5; switches or as existing capacity is exhausted; build an entirely green-field network providing broadband voice and data and/or POTS voice using a single switching platform."
Lucent	Softswitch – T3	Will "offer Voice over Packet Connectivity for toll/tandem (Class 4) functions . . . will include core revenue generating voice services . . . running in a converged-voice/data-network."
VocalData	VOISS	"The VOISS solution is a feature-rich service delivery softswitch that enables service providers to offer carrier-grade voice services and enhanced applications on an open architecture."
Sources: See Appendix M.		

APPENDIX K. CLEC NETWORKS BY MSA

This appendix tabulates the number of CLEC networks in the 150 largest Metropolitan Statistical Areas (MSAs). It is based on the CLEC reports prepared by New Paradigm Resources Group (NPRG).

The data for 2001 are from NPRG's latest report – the *CLEC Report 2002* – which describes CLEC networks as either "Operational," "On-Net," "Resale," or "Planned." We have tabulated only Operational and On-Net networks, both of which appear to involve the use of a CLEC's own facilities. CLECs operating On-Net networks are indicated in italics.

The data for 1998 are based on NPRG's *CLEC Report 1999*, which describe CLEC networks as either "Operational," "Off-Net," or "Planned." We have counted both "Operational" and "Off-Net" networks in the 1998 totals. CLECs operating "Off-Net" networks are indicated in italics.

In some MSAs, the total number of Operational and On-Net networks exceeds the number of CLECs operating within those MSAs. This is due to the fact that, in some instances, individual CLECs operate multiple networks within the same MSA.

The 2001 totals include the networks of CLECs that have declared bankruptcy. Most such CLECs are still operational (and some are now emerging from bankruptcy). Moreover, network facilities such as fiber are a sunk investment, so if one company ceases to use its network it is highly likely that another company will quickly seize the opportunity to do so (and will probably be able to obtain the facilities at a fire-sale price). In any event, networks operated by CLECs that have declared bankruptcy (as of March 31, 2002) represent no more than 18 percent of the totals counted here.

MSA	CLEC Networks – 1998	CLEC Networks – 2001
1. Los Angeles-Long Beach, CA	Allegiance Telecom; AT&T; Electric Lightwave; FirstWorld Communications; Focal; Global NAPs; GST Telecommunications; ICG Communications; Intermedia; Level 3 Communications; *MediaOne Telecommunications*[*]; MGC Communications; *Net-Tel Corporation*; NEXTLINK Communications (XO); Pac West Telecom; US Telepacific; WinStar; WorldCom **CLECs: 18** **Operational Networks: 29** **Off-Net Networks: 2**	Adelphia Business Solutions; Allegiance Telecom; AT&T; Cogent Communications; Cox Communications; Eagle Communications; Focal; Global Crossing; Globalcom; *ICG Communications*; IntelliSpace; Intermedia; Mpower; Net2000; Network Plus; Pac-West Telecomm; PaeTec; *RCN*; Sphera Optical Networks; Telseon; *Time Warner Telecom, Inc.*, US Telepacific; Verado Holdings; WinStar; WorldCom; XO **CLECs: 26** **Operational Networks: 33** **On-Net Networks: 12**
2. New York, NY	Allegiance Telecom; AT&T; BTI; Cablevision Lightpath; Community Networks; CTC Communications; DualStar Communications; e.spire; Eagle Communications; Electric Lightwave; Focal; Frontier Communications; Global NAPs; Hyperion Telecommunications; Intermedia; Level 3 Communications; d/b/a Met Tel; Marathon Communications; Metromedia Fiber Network; Net2000; *Net-Tel Corporation*; NEXTLINK Communications (XO); North American Telecommunications; NorthEast Optic Network Services; RCN; Reach Communications; *RNK*; Time Warner Telecom; WinStar; WorldCom **CLECs: 30** **Operational Networks: 41** **Off-Net Networks: 2**	Adelphia Business Solutions; Allegiance Telecom; *Arbros Communications*; AT&T; Broadview Networks; BTI; Cablevision Lightpath; Cogent Communications; CTC Communications; e.spire; Eagle Communications; Fairpoint Communications; *Focal*; GiantLoop Network; GlobalCrossing; Globalcom; IntelliSpace; Intermedia; Lightyear Communications; NECLEC; Net2000; Network Plus; *PaeTec*; *RCN*; Reach Communications; Sphera Optical Networks; Telseon; Time Warner Telecom; WinStar; WorldCom; XO **CLECs: 31** **Operational Networks: 56** **On-Net Networks: 8**
3. Chicago, IL	21st Century; Allegiance Telecom; AT&T; Dakota Services; Eagle Communications; Electric Lightwave; Focal; Frontier Communications; Global NAPs; Globalcom; InterAccess; Intermedia; Level 3 Communications; MGC Communications; *Net-Tel Corporation*; NEXTLINK Communications (XO); Ovation Communications; Sharon Telephone Company; WinStar; WorldCom **CLECs: 20** **Operational Networks: 23** **Off-Net Networks: 1**	Adelphia Business Solutions; Allegiance Telecom; *AT&T*; Cogent Communications; CoreComm; Digital Pipeline Communications; *Eagle Communications*; Focal; GiantLoop Network; Global Crossing; Globalcom; IntelliSpace; Intermedia; *Lightyear Communications*; *McLeodUSA*; Mpower; Net2000; Network Plus; PaeTec; *RCN*; Sharon Telephone Company; TDS Metrocom; Telseon; *Time Warner Telecom*; WinStar; WorldCom; XO; Yipes **CLECs: 28** **Operational Networks: 47** **On-Net Networks: 8**
4. Philadelphia, PA-NJ	Allegiance Telecom; AT&T; Conectiv Communications; e.spire; Eagle Communications; Focal; Hyperion Telecommunications; Intermedia; Level 3 Communications; Metromedia Fiber Network; *Net-Tel Corporation*; NEXTLINK Communications (XO); WinStar; WorldCom **CLECs: 14** **Operational Networks: 19** **Off-Net Networks: 2**	Adelphia Business Solutions; Allegiance Telecom; Arbros Communications; AT&T; Broadview Networks; BTI Telecom; CEI Networks; Cogent Communications; *Comcast Business Communications*; *CoreComm*; e.spire; Eagle Communications; *Focal*; GiantLoop Network; Global Crossing; IntelliSpace; Intermedia; Net2000; *RCN*; Telseon; US LEC; WinStar; WorldCom; XO; Yipes **CLECs: 25** **Operational Networks: 40** **On-Net Networks: 15**

[*] The names of CLECs operating Off-Net networks in 1998, or On-Net networks in 2001, appear in italics.

MSA	CLEC Networks – 1998	CLEC Networks – 2001
5. Washington, DC-MD-VA-WV	AT&T; e.spire; Electric Lightwave; FairPoint Communications; Fiber Services, Inc.; Focal; Frontier Communications; Global NAPs; Hyperion Telecommunications; Intermedia; Jones Communications; Level 3 Communications; Metromedia Fiber Network; Net2 Communications; *Net-Tel Corporation*; RCN; WinStar; WorldCom **CLECs: 18** **Operational Networks: 31** **Off-Net Networks: 2**	Adelphia Business Solutions; Advanced TelCom Group; Allegiance Telecom; *Arbros Communications*; AT&T; BTI Telecom; Cavalier Telephone; Cogent Communications; *Comcast Business Communications*; e.spire; Fairpoint Communications; *Focal*; Global Crossing; Global NAPs; Globalcom; IntelliSpace; Intermedia; Net2000; PaeTec; *RCN*; Sigma Networks; US LEC; WinStar; WorldCom; XO. **CLECs: 25** **Operational Networks: 59** **On-Net Networks: 13**
6. Detroit, MI	AT&T; Coast to Coast Telecommunications; Frontier Communications; Intermedia; Level 3 Communications; *Net-Tel Corporation*; US MidTel; WinStar; WorldCom. **CLECs: 9** **Operational Networks: 18** **Off-Net Networks: 1**	Adelphia Business Solutions; Allegiance Telecom; AT&T; Comcast Business Communications; Focal; Intermedia; Lightyear Communications; MichTel; Mpower; TDS Metrocom; TelNet Worldwide; Telseon; WorldCom; XO. **CLECs: 14** **Operational Networks: 35**
7. Houston, TX	AT&T; CapRock Communications; Digital Teleport; e.spire; Eagle Communications; GST Telecommunications; ICG Communications; Intermedia; ITC DeltaCom; Level 3 Communications; Logix Communications; *Net-Tel Corporation*; OpTel Telecom; Pointe Communications; Time Warner Telecom; WinStar; WorldCom **CLECs: 17** **Operational Networks: 16** **Off-Net Networks: 1**	Adelphia Business Solutions; Allegiance Telecom; AT&T; *Birch Telecom*; Cogent Communications; e.spire; *Eagle Communications*; Focal; Global Crossing; ICG Communications; Intermedia; Ionex Telecommunications; ITC^DeltaCom; *Lightyear Communications*; Logix Communications Enterprises; Madison River Communications; Mpower; Telseon; Time Warner Telecom; WorldCom; XO; Yipes **CLECs: 22** **Operational Networks: 25** **On-Net Networks: 3**
8. Atlanta, GA	Allegiance Telecom; BTI; Convergent Communications; e.spire; Eagle Communications; Electric Lightwave; Frontier Communications; Global NAPs; ICG Communications; Intermedia; ITC DeltaCom; Level 3 Communications; Marietta Fibernet; MediaOne Telecommunications; MGC Communications; *Net-Tel Corporation*; NEXTLINK Communications (XO); Pointe Communications; US LEC; WinStar; WorldCom **CLECs: 21** **Operational Networks: 35** **Off-Net Networks: 1**	Adelphia Business Solutions; Allegiance Telecom; AT&T; *Birch Telecom*; BTI Telecom; Cbeyond Communications; Cogent Communications; Cox Communications; e.spire; Eagle Communications; Focal; Global Crossing; Globalcom; ICG Communications; IntelliSpace; Intermedia; ITC^DeltaCom; LecStar; Lightyear Communications; Madison River Communications; Mpower; Network Plus; Network Telephone; *NewSouth Communications*; NuVox Communications; Telseon; Time Warner Telecom; US LEC; WorldCom; XO; Yipes **CLECs: 31** **Operational Networks: 45** **On-Net Networks: 6**

MSA	CLEC Networks – 1998	CLEC Networks – 2001
9. Dallas, TX	Allegiance Telecom; AT&T; BTI; CapRock Communications; Convergent Communications; e.spire; Eagle Communications; Electric Lightwave; Frontier Communications; GST Telecommunications; ICG Communications; Intermedia; ITC DeltaCom; Level 3 Communications; Logix Communications; *Net-Tel Corporation*; NEXTLINK Communications (XO); OpTel Telecom; Pointe Communications; Telephone Plus; WinStar; WorldCom **CLECs: 22** **Operational Networks: 23** **Off-Net Networks: 2**	Adelphia Business Solutions; Allegiance Telecom; AT&T; *Birch Telecom*; BTI Telecom; Cbeyond Communications; Cogent Communications; e.spire; *Eagle Communications*; Fairpoint Communications; Focal; GiantLoop Network; Global Crossing; ICG Communications; IntelliSpace; Intermedia; Ionex Telecommunications; ITC^DeltaCom; Lightyear Communications; Logix Communications Enterprises; Madison River Communications; Mpower; Net2000; NTS Communications; Sphera Optical Networks; Tellaire Corporation; Telseon; Time Warner Telecom; WorldCom; XO; Yipes **CLECs: 31** **Operational Networks: 36** **On-Net Networks: 2**
10. Boston, MA-NH	Allegiance Telecom; AT&T; CTC Communications; Eagle Communications; Focal; Frontier Communications; Global NAPs; HarardNet; Intermedia; Level 3 Communications; MediaOne Telecommunications; *Net-Tel Corporation*; NorthEast Optic Network Services; RCN; RNK; WinStar; WorldCom **CLECs: 17** **Operational Networks: 46** **Off-Net Networks: 1**	Adelphia Business Solutions; Allegiance Telecom; *Arbros Communications*; AT&T; Broadview Networks; Cogent Communications; Conversent Communications; CTC Communications; *Eagle Communications*; Focal; GiantLoop Network; Global Crossing; IntelliSpace; Intermedia; *Lightship Telecom*; *Lightyear Communications*; NECLEC; Net2000; Network Plus; PaeTec; *RCN*; *RNK Telecom*; Sphera Optical Networks; WinStar; WorldCom; XO; Yipes **CLECs: 27** **Operational Networks: 54** **On-Net Networks: 35**
11. Riverside-San Bernardino, CA	GST Telecommunications; ICG Communications; MGC Communications; Pac West Telecom **CLECs: 4** **Operational Networks: 11**	*AT&T*; *ICG Communications*; Mpower; Pac-West Telecomm; *Verado Holdings* **CLECs: 5** **Operational Networks: 6** **On-Net Networks: 4**
12. Phoenix-Mesa, AZ	Advanced Radio Telecom; AT&T; CapRock Communications; Cox Communications; Digital Teleport; Electric Lightwave; Frontier Communications; GST Telecommunications; ICG Communications; Intermedia; *Net-Tel Corporation*; NEXTLINK Communications (XO); Telephone Plus; WinStar; WorldCom **CLECs: 15** **Operational Networks: 14** **Off-Net Networks: 1**	Adelphia Business Solutions; Allegiance Telecom; AT&T; Cox Communications; e.spire; Eschelon Telecom; Global Crossing; Intermedia; Lightyear Communications; McLeodUSA; Pac-West Telecomm; Telseon; WorldCom; XO **CLECs: 14** **Operational Networks: 16**
13. San Diego, CA	AT&T; Electric Lightwave; Frontier Communications; GST Telecommunications; ICG Communications; Level 3 Communications; MGC Communications; Net-Tel Corporation; PacWest Telecom; Time Warner Telecom; WinStar; WorldCom **CLECs: 12** **Operational Networks: 17**	Allegiance Telecom; AT&T; Cox Communications; Global Crossing; *ICG Communications*; IntelliSpace; Lightyear Communications; Mpower; Pac-West Telecomm; PaeTec; *RCN*; Telseon; Time Warner Telecom; US Telepacific; WorldCom; *Verado Holdings*; XO; Yipes **CLECs: 18** **Operational Networks: 17** **On-Net Networks: 6**

MSA	CLEC Networks – 1998	CLEC Networks – 2001
14. Minneapolis-St. Paul	AT&T; Bresnan Communications; Frontier Communications; InfoTel Communications; Integra Telecom; KMC Telecom; MediaOne Telecommunications; *Net-Tel Corporation*; Ovation Communications; WinStar; WorldCom **CLECs: 11** **Operational Networks: 12** **Off-Net Networks: 1**	Allegiance Telecom; *AT&T*; *Eschelon Telecom*; Focal; Global Crossing; HickoryTech; Integra Telecom; Intermedia; KMC Telecom; *McLeod USA*; *Time Warner Telecom*; WorldCom; XO **CLECs: 13** **Operational Networks: 16** **On-Net Networks: 6**
15. Orange County, CA	AT&T; Cox Communications; FirstWorld Communications; Focal; Frontier Communications; GST Telecommunications; ICG Communications; MGC Communications; *Net-Tel Corporation*; NEXTLINK Communications (XO); Pac West Telecomm; WinStar; WorldCom **CLECs: 13** **Operational Networks: 21** **Off-Net Networks: 1**	Allegiance Telecom; AT&T; Cox Communications; *Focal*; Global Crossing; *ICG Communications*; *Lightyear Communications*; Mpower; Pac-West Telecomm; PaeTec; Time Warner Telecom; Verado Holdings; *US Telepacific*; WorldCom; XO **CLECs: 15** **Operational Networks: 27** **On-Net Networks: 4**
16. Nassau-Suffolk, NY	Cablevision Lightpath; CTC Communications; Intermedia **CLECs: 3** **Operational Networks: 9**	AT&T; *Cablevision Lightpath*; Conversent Communications; CTC Communications; IntelliSpace; Intermedia; WorldCom **CLECs: 7** **Operational Networks: 15** **On-Net Networks: 5**
17. St. Louis, MO-IL	AT&T; Birch Telecom; BroadSpan Communications; Digital Teleport; Frontier Communications; Intermedia; *Net-Tel Corporation*; WinStar; WorldCom **CLECs: 9** **Operational Networks: 8** **Off-Net Networks: 1**	Allegiance Telecom; AT&T; Birch Telecom; Global Crossing; Intermedia; Lightyear Communications; Logix Communications Enterprises; *McLeodUSA*; NuVox Communications; Telseon; WorldCom; XO **CLECs: 12** **Operational Networks: 23** **On-Net Networks: 1**
18. Baltimore, MD	AT&T; Conectiv; e.spire; Intermedia; Level 3 Communications; Net2 Communications; *Net-Tel Corporation*; WinStar; WorldCom **CLECs: 9** **Operational Networks: 9** **Off-Net Networks: 1**	Adelphia Business Solutions; Advanced TelCom Group; Allegiance Telecom; *Arbros Communications*; AT&T; Cavalier Telephone; Comcast Business Communications; e.spire; Focal; Global Crossing; IntelliSpace; Intermedia; *Lightyear Communications*; Net2000; *PaeTec*; *RCN*; US LEC; WorldCom; XO **CLECs: 19** **Operational Networks: 16** **On-Net Networks: 4**
19. Oakland, CA	Allegiance Telecom; AT&T; Focal; Frontier Communications; GST Telecommunications; ICG Communications; *Net-Tel Corporation*; NEXTLINK Communications (XO); Pac West Telecomm; WinStar; WorldCom **CLECs: 11** **Operational Networks: 20** **Off-Net Networks: 1**	Allegiance Telecom; AT&T; *Focal*; Global Crossing; *ICG Communications*; Mpower; Pac-West Telecomm; *US Telepacific*; WorldCom; XO **CLECs: 10** **Operational Networks: 10** **On-Net Networks: 3**

MSA	CLEC Networks – 1998	CLEC Networks – 2001
20. Seattle-Bellevue-Everett, WA	Advanced Radio Telecom; AT&T; Convergent Communications; Electric Lightwave; Frontier Communications; GST Telecommunications; Level 3 Communications; Marathon Communications; *Net-Tel Corporation*; Telephone Plus; WinStar; WorldCom **CLECs: 12** **Operational Networks: 13**	Adelphia Business Solutions; Allegiance Telecom; *AT&T*; Cogent Communications; Eschelon Telecom; Focal; Global Crossing; Integra Telecom; Intermedia; Lightyear Communications; *McLeodUSA*; Pac-West Telecomm; Telseon; Terabeam; WinStar; WorldCom; XO **CLECs: 17** **Operational Networks: 20** **On-Net Networks: 2**
21. Tampa-St. Petersburg-Clearwater, FL	AT&T; e.spire; Eagle Communications; Florida Digital Network; Frontier Communications; Hyperion Telecommunications; Intermedia; *Net-Tel Corporation*; Time Warner Telecom; US LEC; WinStar; WorldCom **CLECs: 12** **Operational Networks: 12**	Adelphia Business Solutions; Allegiance Telecom; AT&T; BTI; e.spire; *Eagle Communications*; *Florida Digital Network*; Global Crossing; Intermedia; ITC DeltaCom; Mpower; Net2000; NewSouth Communications; Telseon; Time Warner Telecom; *US LEC*; WinStar; WorldCom; XO **CLECs: 19** **Operational Networks: 23** **On-Net Networks: 5**
22. Pittsburgh, PA	AT&T; Hyperion Telecommunications; Intermedia; *Net-Tel Corporation*; WorldCom **CLECs: 5** **Operational Networks: 4** **Off-Net Networks: 1**	Adelphia Business Solutions; *Arbros Communications*; AT&T; Choice One Communications; Global Crossing; Intermedia; PennTelecom; *RCN*; US LEC; WorldCom; Yipes **CLECs: 11** **Operational Networks: 21** **On-Net Networks: 2**
23. Cleveland-Lorain-Elyria, OH	AT&T; Cox Communications; e.spire; Frontier Communications; ICG Communications; Intermedia; *Net-Tel Corporation*; NEXTLINK Communications (XO); WinStar; WorldCom **CLECs: 10** **Operational Networks: 9** **Off-Net Networks: 1**	Adelphia Business Solutions; Allegiance Telecom; AT&T; Cablevision Lightpath; CoreComm; Focal; Global Crossing; ICG Communications; Intermedia; Lightyear Communications; McLeodUSA; Mpower; WorldCom; XO **CLECs: 14** **Operational Networks: 15**
24. Miami, FL	BTI; Eagle Communications; Florida Digital Network; Global NAPs; Hyperion Telecommunications; Intermedia; MediaOne Telecommunications; *Net-Tel Corporation*; NEXTLINK Communications (XO); Pointe Communications; US LEC; WinStar; WorldCom **CLECs: 13** **Operational Networks: 13** **Off-Net Networks: 1**	Adelphia Business Solutions; Allegiance Telecom; AT&T; BTI Telecom; Cogent Communications; e.spire; *Eagle Communications*; *Florida Digital Network*; Intermedia; *Lightyear Communications*; Mpower; Net2000; Network Plus; NewSouth Communications; NuVox Communications; PaeTec; Sphera Optical Networks; Telseon; US LEC; WorldCom; XO; Yipes **CLECs: 22** **Operational Networks: 23** **On-Net Networks: 3**
25. Denver, CO	AT&T; Convergent Communications; Electric Lightwave; Frontier Communications; GST Telecommunications; ICG Communications; Intermedia; Level 3 Communications; *Net-Tel Corporation*; NEXTLINK Communications (XO); Telephone Plus; WinStar; WorldCom **CLECs: 13** **Operational Networks: 12** **Off-Net Networks: 1**	Adelphia Business Solutions; Allegiance Telecom; AT&T; Eschelon Telecom; Global Crossing; ICG Communications; Intermedia; Lightyear Communications; McLeodUSA; Net2000; Pac-West Telecomm; Telseon; Terabeam; *Time Warner Telecom*; Vanion; WinStar; WorldCom; XO; Yipes **CLECs: 19** **Operational Networks: 24** **On-Net Networks: 1**

MSA	CLEC Networks – 1998	CLEC Networks – 2001
26. Newark, NJ	Focal; Hyperion Telecommunications; MH Lightnet; *Net-Tel Corporation*; WinStar; WorldCom **CLECs: 6** **Operational Networks: 6** **Off-Net Networks: 1**	Adelphia Business Solutions; Allegiance Telecom; *Arbros Communications*; AT&T; Cablevision Lightpath; *Comcast Business Communications*; *Focal*; IntelliSpace; *Lightyear Communications*; Net2000; *RCN*; WorldCom; XO **CLECs: 13** **Operational Networks: 16** **On-Net Networks: 5**
27. Portland-Vancouver, OR-WA	Advanced Radio Telecom; AT&T; Beaver Creek Cooperative Telephone; Convergent Communications; Electric Lightwave; FirstWorld Communications; Frontier Communications; GST Telecommunications; Integra Telecom; *Net-Tel Corporation*; NEXTLINK Communications (XO); Telephone Plus; WinStar; WorldCom **CLECs: 14** **Operational Networks: 17** **Off-Net Networks: 1**	Adelphia Business Solutions; Advanced TelCom Group; Allegiance Telecom; AT&T; Eschelon Telecom; Global Crossing; Integra Telecom; Intermedia; McLeodUSA; RIO Communications; WorldCom; XO. **CLECs: 12** **Operational Networks: 15**
28. San Francisco, CA	Allegiance Telecom; AT&T; Convergent Communications; Electric Lightwave; Focal; GST Telecommunications; ICG Communications; Intermedia; Level 3 Communications; *Net-Tel Corporation*; NEXTLINK Communications (XO); Pac West Telecomm; Telephone Plus; WinStar; WorldCom **CLECs: 15** **Operational Networks: 17**	Adelphia Business Solutions; Allegiance Telecom; AT&T; Cogent Communications; Focal; GiantLoop Network; Global Crossing; Globalcom; ICG Communications; IntelliSpace; Intermedia; *Lightyear Communications*; Mpower; Net2000; Pac-West Telecomm; *RCN*; Telseon; *US Telepacific*; WorldCom; XO **CLECs: 20** **Operational Networks: 21** **On-Net Networks: 9**
29. Kansas City, MO-KS	Advanced Communications Group; AT&T; Birch Telecom; Digital Teleport; e.spire; ExOp of Missouri; Frontier Communications; Intermedia; Logix Communications; *Net-Tel Corporation*; WinStar; WorldCom **CLECs: 12** **Operational Networks: 17** **Off-Net Networks: 2**	AT&T; Birch Telecom; e.spire; Global Crossing; *Ionex Telecommunications*; Intermedia; Lightyear Communications; Logix Communications; McLeodUSA; NuVox Communications; WorldCom **CLECs: 11** **Operational Networks: 11** **On-Net Networks: 2**
30. San Jose, CA	AT&T; Focal; Frontier Communications; ICG Communications; Level 3 Communications; *Net-Tel Corporation*; NEXTLINK Communications (XO); Pac West Telecomm; WorldCom **CLECs: 9** **Operational Networks: 21** **Off-Net Networks: 2**	Allegiance Telecom; AT&T; Cogent Communications; e.spire; *Focal*; Global Crossing; *ICG Communications*; Net2000; Pac-West Telecomm; US Telepacific; *WorldCom*; XO; Yipes **CLECs: 13** **Operational Networks: 19** **On-Net Networks: 4**
31. Cincinnati, OH-KY-IN	AT&T; ICG Communications; Intermedia; *Net-Tel Corporation*; Time Warner Telecom; WorldCom **CLECs: 6** **Operational Networks: 5** **Off-Net Networks: 1**	Adelphia Business Solutions; AT&T; Broadslate Networks; Global Crossing; ICG Communications; Intermedia; Lightyear Communications; NuVox Communications; Telseon; Time Warner Telecom; WorldCom **CLECs: 11** **Operational Networks: 13**

MSA	CLEC Networks – 1998	CLEC Networks – 2001
32. Fort Worth-Arlington, TX	Allegiance Telecom; AT&T; CapRock Communications; e.spire; Frontier Communications; Logix Communications; *Net-Tel Corporation*; WorldCom **CLECs: 8** **Operational Networks: 8** **Off-Net Networks: 1**	Allegiance Telecom; AT&T; *Birch Telecom*; e.spire; Focal; Global Crossing; Intermedia; Logix Communications; Mpower **CLECs: 9** **Operational Networks: 10** **On-Net Networks: 2**
33. Orlando, FL	AT&T; BTI; Florida Digital Network; Hyperion Telecommunications; Intermedia; ITC DeltaCom; *Net-Tel Corporation*; Orlando Telephone Company; Time Warner Telecom; US LEC; WorldCom **CLECs: 11** **Operational Networks: 11** **Off-Net Networks: 2**	Adelphia Business Solutions; AT&T; BTI; e.spire; *Florida Digital Network*; Global Crossing; Intermedia; ITC^DeltaCom; Net2000; Network Plus; Network Telephone; NewSouth Communications; Orlando Telephone Company; Telseon; Time Warner Telecom; US LEC; WorldCom **CLECs: 17** **Operational Networks: 23** **On-Net Networks: 4**
34. Sacramento, CA	AT&T; Electric Lightwave; Frontier Communications; GST Telecommunications; ICG Communications; Net-Tel Corporation; Pac West Telecomm; Telephone Plus; WinStar; WorldCom **CLECs: 10** **Operational Networks: 10**	Allegiance Telecom; AT&T; Global Crossing; ICG Communications; Mpower; Pac-West Telecomm; Western Integrated Networks; WorldCom; XO **CLECs: 9** **Operational Networks: 11**
35. San Antonio, TX	e.spire; ICG Communications; Intermedia; ITC DeltaCom; Logix Communications; Net-Tel; Telephone Plus; Time Warner Telecom; Waller Creek Communications; WorldCom **CLECs: 10** **Operational Networks: 10**	Adelphia Business Solutions; Allegiance Telecom; AT&T; *Birch Telecom*; e.spire; Global Crossing; Grande Communications; ICG Communications; ITC^DeltaCom; Logix Communications; Mpower; Time Warner Telecom; WorldCom; XO **CLECs: 14** **Operational Networks: 15** **On-Net Networks: 1**
36. Las Vegas, NV-AZ	Digital Teleport; e.spire; Electric Lightwave; GST Telecommunications; MGC Communications; *Net-Tel Corporation*; NEXTLINK Communications (XO); Telephone Plus; WinStar **CLECs: 9** **Operational Networks: 9** **Off-Net Networks: 1**	Cox Communications; e.spire; *Eagle Communications*; Intermedia; Mpower; Pac-West Telecomm; US Telepacific; XO **CLECs: 8** **Operational Networks: 8** **On-Net Networks: 1**
37. Fort Lauderdale, FL	AT&T; e.spire; Eagle Communications; Florida Digital Network; Intermedia; MediaOne Telecommunications; MGC Communications; *Net-Tel Corporation*; Supra Telecommunications & Information Systems; WorldCom **CLECs: 10** **Operational Networks: 10** **Off-Net Networks: 1**	Adelphia Business Solutions; Allegiance Telecom; AT&T; BTI; e.spire; *Eagle Communications*; Florida Digital Network; Intermedia; ITC^DeltaCom; Mpower; Network Plus; NuVox Communications; *PaeTec*; *US LEC*; WorldCom; Yipes **CLECs: 16** **Operational Networks: 19** **On-Net Networks: 3**
38. Indianapolis, IN	AT&T; Frontier Communications; Intermedia; *Net-Tel Corporation*; Time Warner Telecom; WorldCom **CLECs: 6** **Operational Networks: 5** **Off-Net Networks: 1**	Adelphia Business Solutions; AT&T; Choice One Communications; Global Crossing; Intermedia; Lightyear Communications; McLeodUSA; NuVox Communications; Time Warner Telecom; WinStar; WorldCom **CLECs: 11** **Operational Networks: 15**

MSA	CLEC Networks – 1998	CLEC Networks – 2001
39. Norfolk-Virginia Beach-Newport News, VA-NC MSA	Cox Communications; Hyperion Telecommunications; KMC Telecom; Net2 Communications; US LEC **CLECs: 5** **Operational Networks: 5**	Adelphia Business Solutions; ALLTEL; *Arbros Communications*; AT&T; Cavalier Telephone; Cox Communications; KMC Telecom; Net2000; *US LEC* **CLECs: 9** **Operational Networks: 17** **On-Net Networks: 2**
40. Milwaukee-Waukesha, WI	AT&T; Dakota Services; Globalcom; *Net-Tel Corporation*; Ovation Communications; Time Warner Telecom; US Xchange; WinStar; WorldCom **CLECs: 9** **Operational Networks: 10** **Off-Net Networks: 1**	AT&T; Choice One Communications; Global Crossing; Globalcom; *McLeodUSA*; TDS Metrocom; Time Warner Telecom; WinStar; WorldCom **CLECs: 9** **Operational Networks: 12** **On-Net Networks: 1**
41. Columbus, OH	ICG Communications; Intermedia; *Net-Tel Corporation*; NEXTLINK Communications (XO); Time Warner Telecom; WinStar **CLECs: 6** **Operational Networks: 5** **Off-Net Networks: 1**	Adelphia Business Solutions; AT&T; Choice One Communications; CoreComm; Global Crossing; ICG Communications; Intermedia; McLeodUSA; Mpower; NuVox Communications; Time Warner Telecom; XO **CLECs: 12** **Operational Networks: 12**
42. Charlotte-Gastonia-Rock Hill, NC-SC	AT&T; BTI; Eagle Communications; FairPoint Communications; ICG Communications; Intermedia; Time Warner Telecom; US LEC **CLECs: 8** **Operational Networks: 8**	Adelphia Business Solutions; AT&T; *Birch Telecom*; BTI; CTC Communications; *Eagle Communications*; Global Crossing; ICG Communications; Intermedia; ITC^DeltaCom; Network Telephone; NewSouth Communications; NuVox Communications; Time Warner Telecom; US LEC **CLECs: 15** **Operational Networks: 16** **On-Net Networks: 2**
43. Bergen-Passaic, NJ	AT&T; Intermedia **CLECs: 2** **Operational Networks: 2**	Allegiance Telecom; Conversent Communications; Focal; IntelliSpace **CLECs: 4** **Operational Networks: 5**
44. New Orleans, LA	American MetroComm; Columbia Telecommunications; Cox Communications; e.spire; Hyperion Telecommunications; Intermedia; ITC DeltaCom; NewSouth Communications; WinStar **CLECs: 9** **Operational Networks: 9**	Adelphia Business Solutions; Cox Communications; e.spire; Global Crossing; Intermedia; ITC^DeltaCom; Madison River Communications; Network Telephone; NewSouth Communications; US LEC; Xspedius **CLECs: 11** **Operational Networks: 12**
45. Salt Lake City-Ogden, UT	AT&T; Convergent Communications; Electric Lightwave; GST Telecommunications; *Net-Tel Corporation*; NEXTLINK Communications (XO); Telephone Plus; WinStar; WorldCom **CLECs: 9** **Operational Networks: 11** **Off-Net Networks: 1**	AT&T; Eschelon Telecom; Global Crossing; Integra Telecom; Intermedia; McLeodUSA; Pac-West Telecomm; WorldCom; XO **CLECs: 9** **Operational Networks: 9**

MSA	CLEC Networks – 1998	CLEC Networks – 2001
46. Greensboro-Winston Salem-High Point, NC	BTI; Eagle Communications; Intermedia; ITC DeltaCom; KMC Telecom; Time Warner Telecom; US LEC **CLECs: 7** **Operational Networks: 11** **Off-Net Networks: 1**	ALLTEL; AT&T; BTI; *Birch Telecom*; CTC Communications; *Eagle Communications*; Intermedia; ITC^DeltaCom; KMC Telecom; Madison River Communications; Network Telephone; NewSouth Communications; NuVox Communications; *Time Warner Telecom*; US LEC; Xspedius **CLECs: 16** **Operational Networks: 28** **On-Net Networks: 3**
47. Nashville, TN	AT&T; Eagle Communications; Hyperion Telecommunications; ICG Communications; Intermedia; NewSouth Communications; NEXTLINK Communications (XO); US LEC **CLECs: 8** **Operational Networks: 8**	Adelphia Business Solutions; AT&T; *Birch Telecom*; BTI; *Eagle Communications*; ICG Communications; Intermedia; ITC^DeltaCom; Network Telephone; NewSouth Communications; NuVox Communications; US LEC; XO; Xspedius **CLECs: 14** **Operational Networks: 18** **On-Net Networks: 2**
48. Austin-San Marcos, TX	e.spire; ICG Communications; Intermedia; ITC DeltaCom; Level 3 Communications; Logix Communications; *Net-Tel Corporation*; NEXTLINK Communications (XO); Telephone Plus; Time Warner Telecom; Waller Creek Communications; WorldCom **CLECs: 12** **Operational Networks: 11** **Off-Net Networks: 1**	Adelphia Business Solutions; Allegiance Telecom; AT&T; *Birch Telecom*; e.spire; Global Crossing; Grande Communications; ICG Communications; Intermedia; *ITC^DeltaCom*; Logix Communications; Mpower; Time Warner Telecom; WorldCom; XO **CLECs: 15** **Operational Networks: 15** **On-Net Networks: 2**
49. Buffalo-Niagara Falls, NY	AT&T; Choice One Communications; Hyperion Telecommunications; Intermedia; *Net-Tel Corporation*; WorldCom **CLECs: 6** **Operational Networks: 5** **Off-Net Networks: 1**	Adelphia Business Solutions; AT&T; Broadview Networks; Choice One Communications; *Eagle Communications*; Intermedia; WorldCom **CLECs: 7** **Operational Networks: 7** **On-Net Networks: 1**
50. Middlesex-Somerset-Hunterdon, NJ	AT&T; Hyperion Telecommunications; Intermedia; *Net-Tel Corporation*; WorldCom **CLECs: 5** **Operational Networks: 4** **Off-Net Networks: 1**	Adelphia Business Solutions; AT&T; *Focal*; IntelliSpace; WorldCom **CLECs: 5** **Operational Networks: 8** **On-Net Networks: 1**
51. Hartford, CT	AT&T; Cox Communications; ICG Communications; Intermedia; *Net-Tel Corporation*; NorthEast Optic Network Services; WorldCom **CLECs: 7** **Operational Networks: 6** **Off-Net Networks: 1**	AT&T; Choice One Communications; Conversent Communications; Cox Communications; Global Crossing; Intermedia; Network Plus; PaeTec; WorldCom **CLECs: 9** **Operational Networks: 9**
52. Monmouth-Ocean, NJ		AT&T **CLECs: 1** **Operational Networks: 1**

MSA	CLEC Networks – 1998	CLEC Networks – 2001
53. Raleigh, Durham, Chapel Hill, NC	BTI; Eagle Communications; Intermedia; *Net-Tel Corporation*; Time Warner Telecom; US LEC; WorldCom **CLECs: 7** **Operational Networks: 10** **Off-Net Networks: 1**	Adelphia Business Solutions; ALLTEL; AT&T; BTI; CTC Communications; *Eagle Communications*; Intermedia; ITC^DeltaCom; Madison River Communications; Network Telephone; NewSouth Communications; NuVox Communications; Time Warner; US LEC; WorldCom **CLECs: 15** **Operational Networks: 29** **On-Net Networks: 2**
54. Memphis, TN-AR-MS	Eagle Communications; Hyperion Telecommunications; Intermedia; NEXTLINK Communications (XO); Time Warner Telecom; US LEC; WorldCom **CLECs: 7** **Operational Networks: 7** **Off-Net Networks: 1**	Adelphia Business Solutions; AT&T; *Birch Telecom*; *Eagle Communications*; ICG Communications; Intermedia; ITC^DeltaCom; Mpower; Network Telephone; NewSouth Communications; NuVox Communications; Time Warner Telecom; US LEC; WorldCom; XO; Xspedius **CLECs: 16** **Operational Networks: 16** **On-Net Networks: 2**
55. Providence-Fall River-Warwick, RI-MA	AT&T; CTC Communications; Intermedia; *Net-Tel Corporation*; NorthEast Optic Network Services; *RNK* **CLECs: 6** **Operational Networks: 4** **Off-Net Networks: 2**	AT&T; Choice One Communications; Conversent Communications; Cox Communications; CTC Communications; Intermedia; Log On America; Net2000; *PaeTec*; WorldCom **CLECs: 10** **Operational Networks: 10** **On-Net Networks: 1**
56. Jacksonville, FL	e.spire; Florida Digital Network; Frontier Communications; Hyperion Telecommunications; Intermedia; ITC DeltaCom; MediaOne Telecommunications; *Net-Tel Corporation*; US LEC **CLECs: 9** **Operational Networks: 8** **Off-Net Networks: 1**	Adelphia Business Solutions; ALLTEL; AT&T; BTI; e.spire; *Florida Digital Network*; Intermedia; ITC^DeltaCom; *Lightyear Communications*; NewSouth Communications; NuVox Communications; US LEC **CLECs: 12** **Operational Networks: 15** **On-Net Networks: 3**
57. Rochester, NY	AT&T; Eagle Communications; Frontier Communications; Intermedia; Net-Tel ; Time Warner Telecom; WorldCom **CLECs: 7** **Operational Networks: 7**	AT&T; Choice One Communications; *Eagle Communications*; Global Crossing; Intermedia; Northland Communications; PaeTec; Time Warner Telecom **CLECs: 8** **Operational Networks: 8** **On-Net Networks: 1**
58. Grand Rapids-Muskegon-Holland, MI	*Net-Tel Corporation*; WorldCom **CLECs: 2** **Operational Networks: 1** **Off-Net Networks: 1**	Choice One Communications; MichTel; TDS Metrocom; WorldCom **CLECs: 4** **Operational Networks: 8**
59. West Palm Beach, FL	AT&T; Intermedia; Net-Tel; Supra Telecommunications & Information Systems **CLECs: 4** **Operational Networks: 4**	*Florida Digital Network*; Intermedia; ITC^DeltaCom; Mpower; Network Telephone; *PaeTec*; US LEC **CLECs: 7** **Operational Networks: 11** **On-Net Networks: 3**

MSA	CLEC Networks – 1998	CLEC Networks – 2001
60. Oklahoma City, OK	Cox Communications; Intermedia; Logix Communications; *Net-Tel Corporation*; *WinStar*; WorldCom **CLECs: 6** **Operational Networks: 4** **Off-Net Networks: 2**	AT&T; *Birch Telecom*; Cox Communications; Logix Communications; NuVox Communications; WorldCom **CLECs: 6** **Operational Networks: 6** **On-Net Networks: 1**
61. Louisville, KY	e.spire; Hyperion Telecommunications; ICG Communications; Intermedia **CLECs: 4** **Operational Networks: 4**	Adelphia Business Solutions; AT&T; e.spire; ICG Communications; Intermedia; *Lightyear Communications*; NewSouth Communications; NuVox Communications; US LEC **CLECs: 9** **Operational Networks: 9** **On-Net Networks: 1**
62. Richmond-Petersburg, VA	Hyperion Telecommunications; Intermedia; MediaOne Telecommunications; Net2 Communications; Net-Tel; WorldCom **CLECs: 6** **Operational Networks: 6**	Adelphia Business Solutions; ALLTEL; *Arbros Communications*; *AT&T*; Broadslate Networks; BTI; Cavalier Telephone; Intermedia; Net2000; NTELOS; US LEC **CLECs: 11** **Operational Networks: 11** **On-Net Networks: 2**
63. Dayton-Springfield, OH	ICG Communications; Intermedia. **CLECs: 2** **Operational Networks: 2**	*AT&T*; Broadslate Networks; Choice One Communications; ICG Communications; Intermedia; KMC Telecom; McLeodUSA; NuVox Communications; *Time Warner Telecom* **CLECs: 9** **Operational Networks: 8** **On-Net Networks: 2**
64. Greenville-Spartanburg-Anderson, SC	e.spire; Intermedia; ITC DeltaCom; NewSouth Communications **CLECs: 4** **Operational Networks: 5**	ALLTEL; *Birch Telecom*; BTI; e.spire; Intermedia; ITC^DeltaCom; KMC Telecom; Network Telephone; NewSouth Communications; NuVox Communications **CLECs: 10** **Operational Networks: 13** **On-Net Networks: 1**
65. Fresno, CA	GST Telecommunications; *Net-Tel Corporation*; Pac West Telecom; WorldCom **CLECs: 4** **Operational Networks: 4** **Off-Net Networks: 1**	Adelphia Business Solutions; ICG Communications; Pac-West Telecomm; WorldCom **CLECs: 4** **Operational Networks: 4**
66. Birmingham, AL	AT&T; e.spire; ICG Communications; Intermedia; ITC DeltaCom; *WinStar* **CLECs: 6** **Operational Networks: 5** **Off-Net Networks: 1**	Adelphia Business Solutions; AT&T; *Birch Telecom*; e.spire; ICG Communications; Intermedia; ITC^DeltaCom; Network Telephone; NewSouth Communications; US LEC; Xspedius **CLECs: 11** **Operational Networks: 13** **On-Net Networks: 1**
67. Albany-Schenectady-Troy, NY	AT&T; Choice One Communications; CTC Communications; Hyperion Telecommunications; Intermedia; *Net-Tel Corporation*; Time Warner Telecom; WorldCom **CLECs: 8** **Operational Networks: 8** **Off-Net Networks: 1**	Adelphia Business Solutions; AT&T; Broadview Networks; *Cablevision Lightpath*; Choice One Communications; CTC Communications; Fairpoint Communications; Intermedia; PaeTec; Time Warner Telecom **CLECs: 10** **Operational Networks: 10** **On-Net Networks: 1**

MSA	CLEC Networks – 1998	CLEC Networks – 2001
68. Honolulu, HI	GST Telecommunications; Time Warner Telecom; WinStar **CLECs: 3** **Operational Networks: 3**	Time Warner Telecom **CLECs: 1** **Operational Networks: 1**
69. Tucson, AZ	Cox Communications; e.spire; GST Telecommunications; Net-Tel Corporation; Telephone Plus; *WinStar*; WorldCom **CLECs: 7** **Operational Networks: 6** **Off-Net Networks: 1**	Cox Communications; e.spire; *McLeodUSA*; WorldCom **CLECs: 4** **Operational Networks: 3** **On-Net Networks: 1**
70. Tulsa, OK	e.spire; ICG Communications; Intermedia; Logix Communications; Net-Tel; *WinStar*; WorldCom **CLECs: 7** **Operational Networks: 6** **Off-Net Networks: 1**	*Birch Telecom*; e.spire; Intermedia; Logix Communications; NuVox Communications; WorldCom **CLECs: 6** **Operational Networks: 6** **On-Net Networks: 1**
71. Ventura, CA		*ICG Communications* **On-Net Networks: 1**
72. Syracuse, NY	AT&T; Eagle Communications; Hyperion Telecommunications; Intermedia; Net-Tel Corporation **CLECs: 5** **Operational Networks: 5**	Adelphia Business Solutions; AT&T; Broadview Networks; Choice One Communications; CTSI; Eagle Communications; Global Crossing; Intermedia; Northland Communications **CLECs: 9** **Operational Networks: 10**
73. Tacoma, WA	AT&T; Electric Lightwave **CLECs: 2** **Operational Networks: 2**	Advanced TelCom Group; *Eschelon Telecom* **CLECs: 2** **Operational Networks: 2** **On-Net Networks: 1**
74. El Paso, TX	Digital Teleport; e.spire; Frontier Communications; Intermedia; *Net-Tel Corporation* **CLECs: 5** **Operational Networks: 4** **Off-Net Networks: 1**	*Birch Telecom*; e.spire; *Ionex Telecommunications*; Logix Communications **CLECs: 4** **Operational Networks: 3** **On-Net Networks: 2**
75. Omaha, NE	AT&T; Convergent Communications; Cox Communications; McLeodUSA **CLECs: 4** **Operational Networks: 4**	ALLTEL; AT&T; Cox Communications; *McLeodUSA* **CLECs: 4** **Operational Networks: 5** **On-Net Networks: 1**
76. Akron, OH	ICG Communications **CLECs: 1** **Operational Networks: 1**	Choice One Communications; Global Crossing; ICG Communications; KMC Telecom; NuVox Communications; XO **CLECs: 6** **Operational Networks: 6**
77. Albuquerque, NM	e.spire; GST Telecommunications; *Net-Tel Corporation*; WorldCom **CLECs: 4** **Operational Networks: 3** **Off-Net Networks: 1**	e.spire; McLeodUSA; *NTS Communications*; Pac-West Telecomm; WorldCom **CLECs: 5** **Operational Networks: 4** **On-Net Networks: 1**

MSA	CLEC Networks – 1998	CLEC Networks – 2001
78. Knoxville, TN	AT&T; Eagle Communications; Hyperion Telecommunications; Intermedia; *Net-Tel Corporation*; US LEC; WorldCom **CLECs: 7** **Operational Networks: 6** **Off-Net Networks: 1**	Adelphia Business Solutions; AT&T; *Birch Telecom*; BTI Telecom; *Eagle Communications*; Intermedia; *NewSouth Communications*; NuVox Communications; US LEC; WorldCom **CLECs: 10** **Operational Networks: 9** **On-Net Networks: 3**
79. Bakersfield, CA	GST Telecommunications; *Net-Tel Corporation*; Pac West Telecomm; WorldCom **CLECs: 4** **Operational Networks: 3** **Off-Net Networks: 1**	AT&T; Pac-West Telecomm; *Verado Holdings*; WorldCom **CLECs: 4** **Operational Networks: 3** **On-Net Networks: 1**
80. Gary, IN	AT&T **CLECs:1** **Networks: 1**	
81. Allentown-Bethlehem-Easton, PA	Hyperion Telecommunications; NEXTLINK Communications (XO); RCN **CLECs: 3** **Operational Networks: 6**	Adelphia Business Solutions; Broadslate Networks; Choice One Communications; RCN; XO **CLECs: 5** **Operational Networks: 8**
82. Harrisburg-Lebanon-Carlisle, PA	Conectiv Communications; CTSI; Hyperion Telecommunications; Intermedia; NEXTLINK Communications (XO) **CLECs: 5** **Operational Networks: 5**	Adelphia Business Solutions; *Arbros Communications*; Broadslate Networks; Choice One Communications; CTSI; Intermedia; XO **CLECs: 7** **Operational Networks: 7** **On-Net Networks: 1**
83. Scranton-Wilkes-Barre-Hazleton, PA	CTSI; Hyperion Telecommunications; NEXTLINK Communications (XO) **CLECs: 3** **Operational Networks: 7**	Adelphia Business Solutions; Choice One Communications; CTSI; Fairpoint Communications; XO **CLECs: 5** **Operational Networks: 11**
84. Toledo, OH	Buckeye TeleSystem; Intermedia; Net-Tel; WorldCom **CLECs: 4** **Operational Networks: 4**	ALLTEL; Buckeye TeleSystem; ICG Communications; Intermedia; KMC Telecom; WorldCom **CLECs: 6** **Operational Networks: 7**
85. Youngstown-Warren, OH	Net-Tel **CLECs: 1** **Operational Networks: 1**	*McLeodUSA* **CLECs: 1** **On-Net Networks: 1**
86. Baton Rouge, LA	American MetroCom; e.spire; Hyperion Telecommunications; Intermedia; ITC DeltaCom; KMC Telecom; *Net-Tel Corporation*; State Communications; US Unwired **CLECs: 9** **Operational Networks: 8** **Off-Net Networks: 1**	Adelphia Business Solutions; e.spire; *ITC^DeltaCom*; Intermedia; KMC Telecom; Network Telephone; *NewSouth Communications*; Xspedius **CLECs: 8** **Operational Networks: 6** **On-Net Networks: 2**
87. Sarasota-Bradenton, FL	KMC Telecom **CLECs: 1** **Operational Networks: 1**	Intermedia; *ITC^DeltaCom*; KMC Telecom; NewSouth Communications **CLECs: 4** **Operational Networks: 5** **On-Net Networks: 1**

MSA	CLEC Networks – 1998	CLEC Networks – 2001
88. Wilmington-Newark, DE-MD	AT&T; Conectiv Communications; Focal; Hyperion Telecommunications; Net-Tel; WorldCom **CLECs: 6** **Operational Networks: 7**	Adelphia Business Solutions; PaeTec **CLECs: 2** **Operational Networks: 2**
89. Springfield, MA	AT&T; CTC Communications; Eagle Communications; Net-Tel; NorthEast Optic Network Services; WorldCom **CLECs: 6** **Operational Networks: 7**	Adelphia Business Solutions; AT&T; Choice One Communications; CTC Communications; *Eagle Communications*; Fairpoint Communications; NECLEC; WorldCom **CLECs: 8** **Operational Networks: 9** **On-Net Networks: 1**
90. Ann Arbor, MI	KMC Telecom; US MidTel **CLECs: 2** **Operational Networks: 2**	Choice One Communications; KMC Telecom; MichTel; Mpower; TDS Metrocom **CLECs: 5** **Operational Networks: 9**
91. Little Rock-North Little Rock, AR	e.spire; Hyperion Telecommunications; Intermedia; *Net-Tel Corporation*; WorldCom **CLECs: 5** **Operational Networks: 4** **Off-Net Networks: 1**	Adelphia Business Solutions; ALLTEL; e.spire; Intermedia; ITC^DeltaCom; Logix Communications; NuVox Communications; WorldCom **CLECs: 8** **Operational Networks: 13**
92. Stockton-Lodi, CA	Net-Tel; Pac West Telecom; WorldCom **CLECs: 3** **Operational Networks: 3**	Pac-West Telecomm; WorldCom **CLECs: 2** **Operational Networks: 2**
93. Charleston-North Charleston, SC	e.spire; Intermedia; Knology Holdings **CLECs: 3** **Operational Networks: 3**	ALLTEL; *Birch Telecom*; BTI; e.spire; Intermedia; ITC^DeltaCom; KMC Telecom; *Knology Broadband*; Network Telephone; *NewSouth Communications*; US LEC **CLECs: 11** **Operational Networks: 14** **On-Net Networks: 6**
94. Jersey City, NJ	AT&T; Intermedia; *Net-Tel Corporation*; WorldCom **CLECs: 4** **Operational Networks: 3** **Off-Net Networks: 1**	AT&T; Focal; IntelliSpace; Intermedia; *RCN*; *Time Warner Telecom* **CLECs: 6** **Operational Networks: 5** **On-Net Networks: 3**
95. McAllen-Edinburg-Mission, TX	CapRock Communications **CLECs: 1** **Operational Networks: 1**	*Ionex Telecommunications* **CLECs: 1** **On-Net Networks: 1**
96. Mobile, AL	e.spire; Hyperion Telecommunications; ITC DeltaCom; *Net-Tel Corporation* **CLECs: 4** **Operational Networks: 3** **Off-Net Networks: 1**	Adelphia Business Solutions; *Birch Telecom*; e.spire; ITC^DeltaCom; Network Telephone; NewSouth Communications; US LEC; Xspedius **CLECs: 8** **Operational Networks: 7** **On-Net Networks: 1**

MSA	CLEC Networks – 1998	CLEC Networks – 2001
97. Vallejo-Fairfield-Napa, CA	Not Available	Not Available
98. New Haven-Meriden, CT	AT&T; Cox Communications; CTC Communications; Intermedia; NorthEast Optic Network Services; *RNK* **CLECs: 6** **Operational Networks: 6** **Off-Net Networks: 1**	AT&T; Choice One Communications; Conversent Communications; Cox Communications; CTC Communications; PaeTec **CLECs: 6** **Operational Networks: 6**
99. Columbia, SC	BTI; e.spire; Intermedia; ITC DeltaCom **CLECs: 4** **Operational Networks: 4**	Adelphia Business Solutions; ALLTEL; *Birch Telecom*; BTI; e.spire; Intermedia; ITC^DeltaCom; KMC Telecom; Network Telephone; NewSouth Communications; NuVox Communications; *Time Warner Telecom* **CLECs: 12** **Operational Networks: 10** **On-Net Networks: 2**
100. Wichita, KS	Advanced Communications Group; Birch Telecom; Hyperion Telecommunications **CLECs: 3** **Operational Networks: 3**	Adelphia Business Solutions; Birch Telecom; Ionex Telecommunications; Logix Communications; NuVox Communications **CLECs: 5** **Operational Networks: 5**
101. Colorado Springs, CO	Hyperion Telecommunications; e.spire; *Net-Tel Corporation* **CLECs: 3** **Operational Networks: 2** **Off-Net Networks: 1**	AT&T; e.spire; ICG Communications; McLeodUSA; SunWest Communications; *Vanion* **CLECs: 6** **Operational Networks: 6** **On-Net Networks: 1**
102. Worcester, MA-CT	AT&T; NorthEast Optic Network Services **CLECs: 2** **Operational Networks: 2**	*AT&T*; Choice One Communications; Conversent Communications; Lightship Telecom; PaeTec **CLECs: 5** **Operational Networks: 5** **On-Net Networks: 1**
103. Fort Wayne, IN	KMC Telecom; US Xchange **CLECs: 2** **Operational Networks: 2** **Off-Net Networks: 1**	Adelphia Business Solutions; Choice One Communications; KMC Telecom **CLECs: 3** **Operational Networks: 3**
104. Melbourne, Titusville, Palm Bay, FL		*Florida Digital Network*; ITC^DeltaCom; NewSouth Communications **CLECs: 3** **Operational Networks: 4** **On-Net Networks: 2**
105. Lakeland-Winter Haven, FL		NewSouth Communications **CLECs: 1** **Operational Networks: 1**
106. Daytona Beach, FL	Intermedia; KMC Telecom **CLECs: 2** **Operational Networks: 2**	*Florida Digital Network*; Intermedia; ITC^DeltaCom; KMC Telecom; NewSouth Communications; PaeTec; *US LEC* **CLECs: 7** **Operational Networks: 6** **On-Net Networks: 2**

MSA	CLEC Networks – 1998	CLEC Networks – 2001
107. Johnson City-Kingsport-Bristol, TN-VA	NA Communications; *Net-Tel Corporation*; P.V. Telecommunications **CLECs: 3** **Operational Networks: 2** **Off-Net Networks: 1**	*US LEC* **CLECs: 1** **Operational Networks: 1** **On-Net Networks: 1**
108. Lexington, KY	e.spire; Hyperion Telecommunications **CLECs: 2** **Operational Networks: 2**	Adelphia Business Solutions; Duro Communications; e.spire; ICG Communications; *Lightyear Communications*; NewSouth Communications; NuVox Communications **CLECs: 7** **Operational Networks: 7** **On-Net Networks: 1**
109. Lancaster, PA	Conectiv Communications; CTSI; Hyperion Telecommunications; NEXTLINK Communications (XO) **CLECs: 4** **Operational Networks: 4**	Adelphia Business Solutions; CTSI; XO **CLECs: 3** **Operational Networks: 3**
110. Augusta-Aiken, GA	Intermedia; ITC DeltaCom; KMC Telecom; Knology Holdings; *Net-Tel Corporation* **CLECs: 5** **Operational Networks: 4** **Off-Net Networks: 1**	ALLTEL; *Birch Telecom*; Intermedia; *ITC^DeltaCom*; KMC Telecom; *Knology Broadband*; *NewSouth Communications* **CLECs: 7** **Operational Networks: 6** **On-Net Networks: 6**
111. Chattanooga TN-GA	AT&T; e.spire; Intermedia; *WinStar* **CLECs: 4** **Operational Networks: 3** **Off-Net Networks: 1**	AT&T; *Birch Telecom*; BTI; e.spire; Intermedia; ITC^DeltaCom; KMC Telecom; Network Telephone; *NewSouth Communications*; US LEC **CLECs: 10** **Operational Networks: 9** **On-Net Networks: 3**
112. Lansing-East Lansing, MI	*Net-Tel Corporation*; WorldCom **CLECs: 2** **Operational Networks: 1** **Off-Net Networks: 1**	Choice One Communications; KMC Telecom; TDS Metrocom; WorldCom **CLECs: 4** **Operational Networks: 4**
113. Kalamazoo-Battle Creek, MI	CTS Telecom; US Xchange **CLECs: 2** **Operational Networks: 6**	Choice One Communications; CTS Telecom; TDS Metrocom **CLECs: 3** **Operational Networks: 3**
114. Santa Rosa, CA	ICG Communications **CLECs: 1** **Operational Networks: 1**	Advanced TelCom Group; *ICG Communications* **CLECs: 2** **Operational Networks: 4** **On-Net Networks: 1**
115. Des Moines, IA	Convergent Communications; McLeodUSA **CLECs: 2** **Operational Networks: 2**	AT&T; Hickory Tech; McLeodUSA **CLECs: 3** **Operational Networks: 6**
116. Bridgeport, CT	AT&T; Cablevision Lightpath; CTC Communications; NorthEast Optic Network Services; *RNK* **CLECs: 5** **Operational Networks: 4** **Off-Net Networks: 1**	*Cablevision Lightpath*; CTC Communications; IntelliSpace **CLECs: 3** **Operational Networks: 2** **On-Net Networks: 1**

MSA	CLEC Networks – 1998	CLEC Networks – 2001
117. Modesto, CA	Not Available	Not Available
118. Flint, MI	Ovation Communications **CLECs: 1** **Operational Networks: 1**	MichTel **CLECs: 1** **Operational Networks: 2**
119. Jackson, MS	e.spire; Hyperion Telecommunications; Intermedia; ITC DeltaCom; *Net-Tel Corporation*; WorldCom **CLECs: 6** **Operational Networks: 5** **Off-Net Networks: 1**	Adelphia Business Solutions; AT&T; e.spire; Intermedia; ITC^DeltaCom; Network Telephone; NewSouth Communications; WorldCom; Xspedius **CLECs: 9** **Operational Networks: 9**
120. Fort Myers-Cape Coral, FL	Intermedia; KMC Telecom **CLECs: 2** **Operational Networks: 2**	Intermedia; ITC^DeltaCom; KMC Telecom; NewSouth Communications; US LEC **CLECs: 5** **Operational Networks: 5**
121. Spokane, WA	Convergent Communications; Electric Lightwave; GST Telecommunications; NEXTLINK Communications (XO); *WinStar* **CLECs: 5** **Operational Networks: 4** **Off-Net Networks: 1**	*AT&T*; *McLeodUSA*; XO **CLECs: 3** **Operational Networks: 3** **On-Net Networks: 2**
122. Madison, WI	Bresnan Communications; Dakota Services; KMC Telecom; TDS MetroCom; US Xchange **CLECs: 5** **Operational Networks: 5**	AT&T; Choice One Communications; KMC Telecom; McLeodUSA; TDS Metrocom **CLECs: 5** **Operational Networks: 6**
123. Pensacola, FL	Intermedia; KMC Telecom **CLECs: 2** **Operational Networks: 2**	Cox Communications; Intermedia; ITC^DeltaCom; KMC Telecom; Madison River Communications; Network Telephone; NewSouth Communications **CLECs: 7** **Operational Networks: 7**
124. Boise City, ID	Electric Lightwave; GST Telecommunications; *Net-Tel Corporation*; *WinStar* **CLECs: 4** **Operational Networks: 2** **Off-Net Networks: 2**	McLeodUSA; Pac-West Telecomm **CLECs: 2** **Operational Networks: 2**
125. Santa Barbara-Santa Maria-Lompoc	Cox Communications; GST Telecommunications **CLECs: 2** **Operational Networks: 2**	Cox Communications; ICG Communications **CLECs: 2** **Operational Networks: 2**
126. Canton-Massillon, OH	Not Available	Not Available
127. Saginaw-Bay City-Midland, MI	Bresnan Communications; Ovation Communications **CLECs: 2** **Operational Networks: 4**	
128. Salinas, CA	Pac West Telecomm **CLECs: 1** **Operational Networks: 1**	Pac-West Telecomm **CLECs: 1** **Operational Networks: 1**
129. Corpus Christi, TX	CapRock Communications; e.spire; ICG Communications; KMC Telecom; *Net-Tel Corporation*; NEXTLINK Communications (XO); WorldCom **CLECs: 7** **Operational Networks: 6** **Off-Net Networks: 1**	*Birch Telecom*; e.spire; ICG Communications; KMC Telecom; Logix Communications **CLECs: 5** **Operational Networks: 5** **On-Net Networks: 1**

MSA	CLEC Networks – 1998	CLEC Networks – 2001
130. Beaumont-Port Arthur, TX	CapRock Communications **CLECs: 1** **Operational Networks: 1**	*Birch Telecom*; *Ionex Telecommunications*; *ITC^DeltaCom* **CLECs: 3** **Operational Networks: 1** **On-Net Networks: 3**
131. Newburgh, NY-PA	Not Available	Not Available
132. York, PA	CTSI; Hyperion Telecommunications **CLECs: 2** **Operational Networks: 2**	Adelphia Business Solutions; CTSI **CLECs: 2** **Operational Networks: 2**
133. Shreveport-Bossier City, LA	e.spire; Hyperion Telecommunications; Intermedia; KM Telecom **CLECs: 4** **Operational Networks: 4**	Adelphia Business Solutions; CenturyTel; e.spire; Intermedia; ITC^DeltaCom; KMC Telecom; Network Telephone; Xspedius **CLECs: 8** **Operational Networks: 8**
134. Lafayette, LA	American MetroComm; Hyperion Telecommunications **CLECs: 2** **Operational Networks: 2**	Adelphia Business Solutions; ITC^DeltaCom; Network Telephone; NewSouth Communications; Xspedius **CLECs: 5** **Operational Networks: 6**
135. Lawrence, MA-NH	AT&T; NorthEast Optic Network Services; *RNK*; Vitts **CLECs: 4** **Operational Networks: 3** **Off-Net Networks: 1**	Intermedia **CLECs: 1** **Operational Networks: 1**
136. Visalia-Tulare-Porterville, CA	Not Available	Not Available
137. Reading, PA	CTSI; Hyperion Telecommunications; NEXTLINK Communications (XO) **CLECs: 3** **Operational Networks: 3**	Adelphia Business Solutions; CEI Networks; CTSI; XO **CLECs: 4** **Operational Networks: 4**
138. Davenport-Moline-Rock Island, IA-IL	McLeodUSA; *Net-Tel Corporation* **CLECs: 2** **Operational Networks: 1** **Off-Net Networks: 1**	AT&T; McLeodUSA **CLECs: 2** **Operational Networks: 2**
139. Rockford, IL	Dakota Services; US Xchange **CLECs: 2** **Operational Networks: 2**	Choice One Communications; TDS Metrocom **CLECs: 2** **Operational Networks: 2**
140. Provo-Orem, UT	Electric Lightwave; *Net-Tel Corporation*; NEXTLINK Communications (XO); WorldCom **CLECs: 4** **Operational Networks: 4** **Off-Net Networks: 1**	*McLeodUSA*; XO **CLECs: 2** **Operational Networks: 1** **On-Net Networks: 1**
141. Appleton-Oshkosh-Neenah, WI	Dakota Services; TDS MetroCom; US Xchange **CLECs: 3** **Operational Networks: 4**	Choice One Communications; TDS Metrocom; *McLeodUSA* **CLECs: 3** **Operational Networks: 6** **On-Net Networks: 2**
142. Biloxi-Gulfport-Pascagoula, MS	American MetroCom; ITC DeltaCom **CLECs: 2** **Operational Networks: 3**	ITC^DeltaCom; Madison River Communications; Network Telephone; *NewSouth Communications* **CLECs: 4** **Operational Networks: 4** **On-Net Networks: 1**

MSA	CLEC Networks – 1998	CLEC Networks – 2001
143. Peoria-Pekin, IL	McLeodUSA **CLECs: 1** **Operational Networks: 4**	Madison River Communications; *McLeodUSA* **CLECs: 2** **Operational Networks: 5** **On-Net Networks: 4**
144. Huntsville, AL	Intermedia; ITC DeltaCom; KMC Telecom; Knology Holdings **CLECs: 4** **Operational Networks: 4**	Intermedia; ITC^DeltaCom; KMC Telecom; *Knology Broadband*; Network Telephone; NewSouth Communications; *US LEC* **CLECs: 7** **Operational Networks: 9** **On-Net Networks: 3**
145. Salem, OR		Advanced TelCom Group; AT&T; *Eschelon Telecom*; Integra Telecom; *McLeodUSA* **CLECs: 5** **Operational Networks: 7** **On-Net Networks: 2**
146. Atlantic-Cape May, NJ	Conectiv Communications **CLECs: 1** **Operational Networks: 1**	AT&T **CLECs: 1** **Operational Networks: 1**
147. Trenton, NJ	AT&T; Conectiv Communications; *Net-Tel Corporation*; WorldCom **CLECs: 4** **Operational Networks: 5** **Off-Net Networks: 1**	AT&T **CLECs: 1** **Operational Networks: 1**
148. Hamilton-Middletown, OH		Intermedia **CLECs: 1** **Operational Networks: 1**
149. Stamford-Norwalk, CT	Cablevision Lightpath; Net-Tel Corporation; NorthEast Optic Network Services; *RNK*; WinStar; WorldCom **CLECs: 6** **Operational Networks: 7** **Off-Net Networks: 1**	AT&T; *Cablevision Lightpath*; Intellispace; PaeTec; WorldCom **CLECs: 5** **Operational Networks: 6** **On-Net Networks: 2**
150. Reno, NV	Net-Tel; WorldCom **CLECs: 2** **Operational Networks: 2**	WorldCom **CLECs: 1** **Operational Networks: 1**
Sources: NPRG CLEC Report 2002, 15th ed.; NPRG CLEC Report 1999, 10th ed.		

APPENDIX L.
ESTIMATING CLEC SPECIAL ACCESS MARKET SHARE

According to the FCC's most recent *Telecommunications Industry Revenues* report, the Bell companies earned $13.3 billion in the provision of "local private line and special access" and "long distance private line services" in 2000.[1] Special access revenues are the sum of these two revenue categories.[2]

The problem with using the FCC's revenue data to estimate CLEC special access revenues is that several CLECs – including the two largest, AT&T and WorldCom – report their special revenues as both CLECs and "toll carriers."[3] For example, when AT&T and WorldCom use their local facilities to supply special access to their long distance network, they typically report that revenue as toll carriers.[4] Not all of the local and long distance private line revenue that these carriers report as toll carriers is necessarily special access revenue, however, and there is no precise way to back out the portion that is.

Rather than engage in guesswork, we have relied on an alternative source for CLEC special access revenue. According to New Paradigm Resource Group's *CLEC Report 2002* (15th ed. 2002), CLECs earned $8.4 billion from the provision of special access/private line services in 2000.[5] Using the New Paradigm figure for CLEC special access revenues and the FCC figure for BOC special access revenues yields a CLEC market share of approximately 39 percent in 2000.

Even using FCC data, however, yields a very high market share. According to the most recent *Telecommunications Industry Revenues* report, CLECs earned $4.1 billion in the provision of local private line and special access and long distance private line services in 2000.[6] In addition, toll carriers reported $100 million in local private line revenues.[7] AT&T also has

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[1] *FCC Telecommunications Industry Revenues, 2002 ed.* at 13 (Table 5, Lines 305 & 312), 17 (Table 6, Lines 406 & 415).

[2] The FCC defines "long distance private line services" to "include revenues from dedicated circuits, private switching arrangements, and/or predefined transmission paths, extending beyond the basic service area. *This category should include revenues from the resale of special access services*." FCC, *Telecommunications Reporting Worksheet, FCC Form 499-A, Instructions for Completing the Worksheet for Filing Contributions to Telecommunications Relay Service, Universal Service, Number Administration, and Local Number Portability Support Mechanisms*, at 18 (Feb. 2001) (emphasis added). AT&T has acknowledged that special access revenues represent the sum of these two categories. *See* Declaration of C. Michael Pfau on Behalf of AT&T Corp. ¶¶ 13-14, *attached to* Reply Comments of AT&T Corp., *Implementation of Local Competition Provisions of the Telecommunications Act of 1996*, CC Docket No. 96-98 (FCC filed Apr. 30, 2001) ("Pfau Decl.").

[3] *See id.* ¶ 16 ("Arguably, MCI/WorldCom and AT&T fall within the category of 'Toll Carrier' and, as a result, any self-supplied special access may not be included in the CLEC figure.").

[4] *See id.* ¶ 17 ("self-supplied access would not be encompassed in the figures and, hence, the need for an adjustment").

[5] *NPRG CLEC Report 2002, 15th ed.,* Ch. 3 at Table 10.

[6] *FCC Telecommunications Industry Revenues, 2002 ed.* at 14 (Table 5, Lines 305 & 312), 18 (Table 6, Lines 406 & 415).

[7] *FCC Telecommunications Industry Revenues, 2002 ed.* at 16 (Table 5, Line 305), 19 (Table 6, Line 406).

acknowledged that the access that AT&T and WorldCom supply to themselves was worth approximately $900 million as of 1999.[8] Assuming that the value of these two carriers' self-supplied special access increased in 2000 by the same amount as it did between 1998 and 1999, the value of this self-supply was approximately $1.1 billion in 2001.[9] That brings total CLEC special access revenues to $5.3 billion under FCC data. This represents a market share of 28 percent.

This figure is undoubtedly too low, however. First, it fails to account for self-supply by long distance carriers other than AT&T and WorldCom, even though many such carriers have local access facilities of their own, and can reasonably be expected to use these facilities to self-provide access to some extent. Second, it excludes completely any special access revenue that AT&T and other interexchange carriers report as long distance private line revenue and that is earned by reselling the services of other CLECs and ILECs. This amount is substantial, as the interexchange carriers are the largest special access customers of both many CLECs and the ILECs, and purchase such services in order to resell them to end users.[10]

Finally, CLECs' share of the special access market was likely even higher in 2001 than it was in 2000. For example, according to the FCC's most recent *Local Telephone Competition* report, CLECs' share of large business lines increased from 17.5 percent to 19.1 percent from December 2000 to June 2001.[11] New Paradigm reports that CLEC special access revenue grew by more than 20 percent between 2000 and 2001.[12]

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[8] Pfau Decl. ¶ 16.

[9] Pfau Decl. ¶ 16 (value of AT&T and WorldCom self-supply increased from $627 million in 1998 to $856 million in 1999).

[10] AT&T has acknowledged that adding this total to CLEC local access and private line revenue would bring total special access revenues in line with the totals reported by New Paradigm. *See* Pfau Decl. ¶ 19 n.4. AT&T has nonetheless argued that it is appropriate to exclude such revenues, but neither of its explanations provides an adequate justification for its approach. First, AT&T has claimed that CLEC/IXC long distance private line revenues should not be counted because the ILECs do not typically compete in the provision of long distance private line service. But the extent to which ILECs provide long distance private service obviously is irrelevant; the only relevant question is the extent to which competing carriers provide private line and special access services that compete with the private line and special access service that ILECs provide. Second, AT&T has claimed that including in the market share calculation the toll carrier special access revenues reported as long distance private line would lead to double counting because ILEC wholesale revenues are included as a cost for Toll Carrier services and reflected in their end user revenues. But including the revenue that competing carriers earn from leasing a CLECs' or ILECs' facilities or reselling their service is not necessarily double counting, because the competing carrier invariably marks up its own retail service to end users over and above the wholesale price. In addition, CLECs often will supplement the services they resell with one or more value-added services to distinguish themselves. In any event, even assuming that there would be some double counting, this is hardly an argument for excluding this entirely as CLEC revenue. Such revenue clearly is CLEC revenue, even if it is earned from customers that are not served entirely over the CLEC's own facilities.

[11] *FCC Local Competition Report, Feb. 2002 ed.* at Table 2.

[12] *NPRG CLEC Report 2002, 15th ed.*, Ch. 3 at Table 11.

APPENDIX M. ADDITIONAL SOURCES

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I. OVERVIEW

Tables

Table 1. Competitive Networks
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Table 3. Competitive Lines/Subscribers
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Table 5. CLEC Mergers & Acquisition Activity
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II. SWITCHING

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III. TRANSPORT

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IV. LOOPS

Tables

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Figures

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Figure 6. Market Share of Residential Broadband Subscribers, YE 2001
Morgan Stanley Cable Modem/xDSL Report at Exh. 3 (cable modem subscribers as of 4Q 2001); *TeleChoice DSL Deployment Summary* (DSL subscribers); *Salomon Smith Barney Battle for High-Speed Data Report* at Figures 1 & 5 (other technologies).

Figure 7. Market Share of New Residential Broadband Subscribers
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V. RESALE

Tables

Table 1. CLECs Opposing the Availability of UNE Platforms
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Figures

Figure 1. Distribution of CLEC Circuit Switches
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Figure 2. Distribution of CLEC Packet Switches
1998. *NPRG CLEC Report 2000, 12th ed.*, Ch. 6, Table 9 (restated 1998 data). ***2001.*** *NPRG CLEC Report 2002, 15th ed.*, Ch. 4 at Table 18. This is a highly conservative estimate. It does not include the 840 packet switches NPRG lists for competitive Independent Operating Companies, utility CLECs, data providers, or Gig-E providers. In addition, it does not include the 7,000 packet switches that NPRG lists for AT&T as of year-end 2001. According to NPRG's prior reports, AT&T had only 50 packet switches as of year-end 2000. Because one-year growth of this magnitude is unlikely, in an abundance of caution we have used the 2000 figure for AT&T's packet switches.

Figure 3. Distribution of CLEC Fiber
1998. *NPRG CLEC Report 2000, 12th ed.*, Ch. 6 at Table 5 (restated 1998 data). ***2001.*** *NPRG CLEC Report 2002, 15th ed.*, Ch. 4 at Table 13. This is a highly conservative estimate. It does not include 117,000 route-miles of fiber that NPRG lists for competitive Independent Operating Companies, utility CLECs, data providers, or Gig-E providers. Moreover, the total miles for 2001 have been adjusted downward to address the concerns that CLECs raised in the Special Access proceeding in April of 2001 (CC Docket No. 96-98).

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APPENDICES

Appendix G. Competitive Collocation Providers in the Top 50 MSAs

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Appendix I. CLECs Providing ATM and Frame Relay

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Appendix J. Additional Information on Softswitches

Table 1. Features of Packet Switches/Softswitches vs. Traditional Circuit Switches

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