verizon

Verizon Communications
1300 I Street NW, Suite 400W
Washington, DC 20005

October 22, 2001

Ex Parte

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
445 12th St., S.W. – Portals
Washington, DC 20554

Re: Petitions for Reconsideration of the Third Report and Order, CC Docket 96-98

Dear Ms. Salas:

The attached ex parte letter to Chairman Powell was provided to Commissioners Abernathy, Copps and Martin today. Please let me know if you have any questions.

Sincerely,

Attachment

cc: Commissioner Abernathy
Commissioner Copps
Commissioner Martin
K. Dixon
P. Jackson
J. Carlisle
J. Goldstein
S. Feder
M. Brill
C. Libertelli
B. Olson

Verizon Communications
1300 I Street NW, Suite 400W
Washington, DC 20005

October 19, 2001

Ex Parte

Honorable Michael Powell
Chairman
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Petitions for Reconsideration of the Third Report and Order,
CC Docket 96-98

Dear Chairman Powell:

The Commission should act now to eliminate, or at a minimum significantly limit, the obligation to provide unbundled local switching.

As you noted in your statement on the Commission's *UNE Remand* decision, "the evidence of CLEC switch deployment strongly suggests that CLECs are not significantly impaired without access to unbundled switching, both in areas in which CLECs have deployed switches and areas in which they have not done so." 15 FCC Rcd 3696, 3927 (1999). Experience in the nearly two years since has confirmed that you were right, and this is all the more true today given the even broader deployment and more widespread use of competitive switching. The continued availability of unbundled local switching under these circumstances serves to undermine and discourage investment in competing facilities by all providers, as both independent analysts and the CLECs themselves have pointed out. And the few issues the Commission relied upon two years ago for not eliminating the switch unbundling requirement have already been addressed.

It is now more important than ever for the Commission to address this issue – which has been pending for nearly two years in the ongoing reconsideration of the *UNE Remand* – in order to reinvigorate investment and facilities-based competition. As independent analysts have concluded, the combination of overly broad unbundling requirements and artificially low TELRIC prices "unintentionally discourages investment and economic growth," and the telecommunications sector "has gone from the propeller of the U.S. economy to an anchor to growth." Scott C. Cleland, Telecom/Tech Policy: From Economic Propeller to Growth Anchor,

Precursor Group Independent Research (October 2, 2001). While both these issues ultimately need to be addressed as part of an overhaul of the nation's competition policy, the unbundled switching issue can and should be addressed now as an initial step toward restoring incentives for long lasting facilities-based competition.

1. Competing Carriers Have Widely Deployed Switching Capability

There is no question that competing carriers are able to compete without using the incumbent carriers' unbundled local switching.

First, as detailed further in the accompanying report, competing carriers have deployed switches in massive and growing numbers. Nationwide, according to the competing carrier trade association, there were nearly 1,000 competitive voice switches as of end of year 2000, and more than 2,000 data switches. *See* ALTS, *The State of Local Competition 2001* at 24 (Feb. 2001). Not only do these data switches compete directly with incumbent voice switches that provide dial up access for Internet traffic, they are increasingly used by competing carriers to provide voice services. *See* Attachment at 16.

Second, in Verizon's service area alone, competing carriers are serving approximately *four million local customers* through the switches they have deployed, including more than *half a million residential customers*. *See* Attachment at 1. And with the exception of the two largest long distance carriers, the CLECs who have deployed their own switches are making virtually no use of unbundled switching. *Id.* at 11. Of course, these figures represent just the customers that competing carriers already *serve* using their own switches; they obviously *offer* service to far more. For example, "AT&T quietly let slip on a Wall Street conference call that its AT&T Broadband unit has attracted more than 100,000 telephone customers in Greater Boston, about 11 percent of all homes that can be served by its phone-over-cable service." *See* Boston Globe, *Quiet On The Lines*, page C-1 (Aug. 13, 2001).

Third, while the largest concentration of CLEC switches is located in the most densely populated areas, CLECs have also deployed their switches in other areas. For example, in the 15 largest Metropolitan Statistical Areas ("MSAs") in Verizon's East region – which contain 70 percent of Verizon East's switched access lines – there are an average of 18 CLEC voice switches and 17 CLEC data switches per MSA. *See* Attachment at 1.

On the other hand, CLECs have not limited their switch deployment to the most densely populated areas. Competing carriers now use their own voice switches to serve customers in approximately two thirds of the MSAs in Verizon's service area, and are doing so in urban, suburban and rural areas. *See* Attachment at 2. Altogether, competing carriers are using their voice switches to serve local exchange customers in rate exchange areas that contain more than 88 percent of Verizon's access lines, including approximately 91 percent of all business lines and approximately 87 percent of all residential lines. *See* Attachment at 8.

Fourth, these figures are doubly conservative because they include only the areas that are currently being served by competing carriers' voice switches (not the areas that could be served) and they also don't include the data switches that competing carriers can use (and in some cases

already are) to provide voice services. Accordingly, the ability of CLECs to compete is even greater than evidenced by the figures in this letter.

2. The Availability of Unbundled Local Switching at TELRIC Rates Undermines Investments in Competing Facilities.

As these straightforward facts demonstrate, not only are alternative sources of switching available outside of Verizon's network, but competing carriers *already are using these alternatives* to serve large and rapidly growing numbers of customers. Under these circumstances, competing carriers would not be "impaired" if they did not have access to unbundled switching.

Indeed, retaining the broad unbundled switching requirement currently in place undermines the investments that already have been made in competing facilities and affirmatively harms the continued growth of long-lasting facilities-based competition. As industry analysts have noted, "[n]o company will deploy and scale facilities if it can achieve similar economics immediately by renting network elements for the ILECs - all with little up-front investment." J.P. Morgan Securities Inc., Broadband 2001 at 18 (April 2, 2001). And CLECs themselves have explained how the unbundled local switching requirement, particularly as part of the network element platform, harms existing investments in telecommunications facilities.

> Based on the advocacy of CLECs that insist that it is too expansive to invest in facilities to serve small customers, the Commission is considering expanding the availability of unbundled switching. But this kind of unnecessary regulatory intervention threatens to harm those CLECs that have built their own facilities and do not need to rely on the UNE-P to serve customers.

Ex Parte Letter from Kevin M. Joseph, Vice President of Government Affairs for Allegiance Telecom, in Docket No. 96-98 at 2 (February 1, 2001).[1]

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[1] *See also, e.g.,* Cox Comments (May 26, 1999) ("A regulatory regime that fosters the broad availability of incrementally priced UNEs discourages competing carriers from building their own networks and leaves them dependent over the long term on the ILECs, to the detriment of the public interest."); Focal Comments (May 26, 1999) ("[I]t would contradict the Act's goal of furthering facilities-based competition to make ILEC unbundled switching compete with CLEC switching in the same area."); Rhythms Comments (May 26, 1999) ("[A] competitor's ability to provide service would, in general, not be materially diminished by an inability to gain access to an ILEC's switch."); C. Michael Armstrong, Chairman & CEO, AT&T, *Telecom and Cable TV: Shared Prospects for the Communications Future*, Remarks Before the Metropolitan Cable Club, Washington, D.C. (Nov. 2, 1998) ("No company will invest billions of dollars to become a facilities-based . . . provider" if other companies "that have not invested a penny of capital nor taken an ounce of risk can come along and get a free ride on the investment and risk of others.").

As one independent analyst has explained, the consequence of the current unbundling and pricing rules "has been to effectively devalue all infrastructure investment by everyone, incumbents and competitors alike, whether it is fiber, cable, or fixed wireless. . . . Why overbuild if one can lease it more cheaply than one can build it?" *See Deployment of Broadband Technologies*, Hearing Before the Subcomm. on Telecommunications, Trade, and Consumer Protection of the House Comm. on Commerce, 106th Cong., 2d Sess. 69 (May 25, 2000) (Prepared Statement of Scott C. Cleland, Managing Director, Legg Mason Precursor Group). More recently, industry analysts have reiterated that the current rules "encouraged speculative investment in uneconomic resale business models and made it very difficult to earn a return on investment in telecom facilities." Scott C. Cleland, Telecom/Tech Policy: From Economic Propeller to Growth Anchor, Precursor Group Independent Research (October 2, 2001).

The reasons for this are straightforward. One of the driving forces behind competition is the opportunity for an entrepreneur to enjoy the full fruits of his investment and innovation, if only on a transient basis. But there is virtually nothing for new entrants to gain by placing their capital at risk if other companies can provide the same services without making their own investment. As Professor Kahn explained, "[i]f rivals can share use of whatever ILEC facilities they ask for – with their mere asking constituting sufficient demonstration that access is 'necessary' to them – at prices explicitly intended to recover only the minimum cost of supply, employing the most modern technology, it cannot but have a fatally discouraging effect on their own imitative and innovative efforts: when every applicant can be a free rider, at such minimum prices, who is going to build the vehicle?" Bell Atlantic Comments, Kahn Declaration at 17.

Professors Areeda and Hovenkamp have likewise concluded that when the government forces a company 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." Philip E. Areeda & Herbert Hovencamp, *Antitrust Law* ¶ 771b, at 175 (rev. ed. 1996). Even key Congressional leaders have acknowledged the danger of too much unbundling: "[a]s long as they can accumulate risk free profits with minimal investment, competitors will not build their own networks to provide competing services." Brief Of Amici Curiae The Hon. W.J. (Billy) Tauzin, John D. Dingell, Dennis Hastert, Rick Boucher, *AT&T v. Iowa Utils. Bd.* (US Supreme Ct. Nov. 15, 1996).

In addition, requiring incumbents to unbundle local switches where competitors have already deployed their own switches undermines those competitors' ability to compete. Having invested billions of dollars in their own facilities, they will not be able to compete effectively against other competitors that simply lease the same facilities from incumbent carriers at TELRIC prices. As Professor Kahn explains, "[t]he discouraging effect of the Commission's prescription for pricing UNEs is not confined to risk-taking innovations by the ILECs; it is equally destructive of the other part of the process of competitive innovation – the efforts of rivals of the successful innovator, by their own efforts, to invent around and surpass the initiator and achieve the market's reward for those efforts." Bell Atlantic Comments, Kahn Declaration at 17.

3. Each Of The Factors Cited By The Commission For Not Eliminating The Unbundled Local Switching Requirement Have Already Been Addressed

Whatever other factors the Commission relied upon to retain the unbundling requirement for local switching, those factors have already been addressed.

First, the collocation factors mentioned by the Commission have since been addressed directly, and massive numbers of collocation arrangements have been completed since the time of the *UNE Remand*. Verizon, for example, has now provisioned a total of more than 11,700 collocation arrangements. *See* Attachment at 12. This represents a nine-fold increase in the last two years, demonstrating that collocation can be provided in large volumes. In fact, through collocation arrangements, CLECs have had access to more than 90 percent of Verizon's access lines. *See Id.*

The Commission also revised its rules to expand the range collocation options and to further ensure that collocation is timely. *Advanced Services Order On Remand* ¶ 5 (adopting t90 day default interval.) *Advanced Services Order* ¶ 6 (adopting new types of collocation.) The Commission repeatedly has found that Verizon's "overall level of on-time performance for completion of physical collocation arrangements satisfies Verizon's section 271 obligations and allows an efficient competitor a meaningful opportunity to compete." *See Massachusetts 271 Order* ¶ 195; *see also New York 271 Order* ¶ 75; *Connecticut 271 Order* ¶¶ 45-50; *Pennsylvania 271 Order* ¶¶ 99.[2]

In addition, there has been an enormous rise in alternative collocation providers (so-called collocation "hotels"). 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." D. Culver, *Construction Boom for Colocation,* Interactive Week (Mar. 13, 2000). They allow "[m]ost new business telecom providers . . . to bypass the traditional infrastructure." V. McCarthy, *Local Carriers Take Over Office Buildings,* Interactive Week (May 22, 2000). Today, there are alternative collocation providers in each of the top 50 MSAs, and there are two or more such providers in all but one of the top 50 MSAs. *See, e.g.,* Attachment at App. C.

Second, concerns about hot cut performance are a thing of the past. Both CLECs and incumbent carriers have obtained greater experience and any previous rough spots in the hot cut process have been ironed out. In Verizon's most recent long distance applications, the Commission repeatedly has found that Verizon performs hot cuts in a manner that allows competing carriers to compete – routinely meeting 95% or more of its installation appointments on time – and that the hot cut process is no longer an issue. *Massachusetts 271 Order* ¶¶ 158-160; *Connecticut 271 Order* ¶ 13; *Pennsylvania 271 Order* ¶ 86. In fact, Verizon's hot cut process has been quality certified (ISO 9000) by an international standards organization.

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[2] The Commission also recently required incumbent LECs to "allow requesting carriers to collocate switching and routing equipment." *Advanced Services Fourth Report and Order,* ¶ 12.

4. There Is Also No Reason For The Commission To Impose Conditions On The Elimination Of The Switch Unbundling Requirement

The Commission neither can nor should condition the elimination of the switch unbundling requirement on a new requirement that incumbent carriers provide loop/transport combinations, sometimes referred to as enhanced extended links ("EELs"). In addition to lacking legal authority, there are also policy reasons why the Commission should not impose this condition on the elimination of the switch unbundling requirement.

As an initial matter, the current state of the law is clear that the Commission may not require new combinations of unbundled network elements. As the Eighth Circuit has reaffirmed: "Congress has directly spoken on the issue of who shall combine previously uncombined network elements. It is the requesting carriers who shall 'combine such elements.'" *Iowa Utilities Board v. FCC*, 219 F.3d 744, 759 (8th Cir. 2000). While the Supreme Court has agreed to review this question, that portion of the Eighth Circuit decision has not been stayed, and under the Hobbs Act continues to be binding on the Commission. 28 U.S.C. § 2342.

Moreover, the record here shows that a requirement to provide new loop/transport combinations is simply unnecessary.[3] In the debate sponsored by the Common Carrier Bureau, there was a consensus among the participants that there was no need to continue the current requirement to provide new loop/transport combinations. Even the PACE coalition, which consists of facilities-based carriers, recognized that there is "no real reason" to tie making loop/transport combinations available with limits on the unbundled switching obligation. *See* Transcript of Switch UNE Debate at 10, CC Dkt. No. 96-98 (Nov. 17, 2000). As the Chief of the Common Carrier Bureau aptly summarized, "nobody in [the] room" supported "a continuing association with the EEL." *Id.* at 19.

That consensus is hardly surprising. The supposed reason for requiring loop/transport combinations was to extend the reach of competitive switches without collocating. As noted above, however, collocation already is widely available and in place, and the supposed need for loop/transport combinations is illusory.

* * *

In sum, the deployment and use of competitive local switching is a success story that should be recognized and promoted by the Commission. A regulatory policy that forces facilities-based competitors to compete with low-priced unbundled switching undermines this

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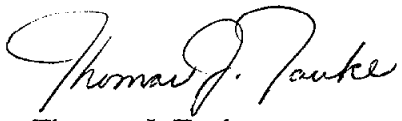
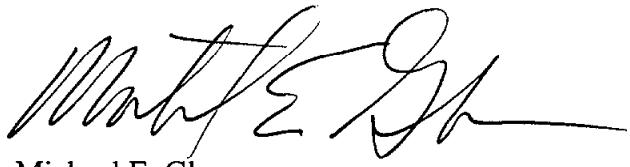
[3] Of course, a requirement to provide existing loop/transport combinations also cannot be justified under the Act unless competitors would be impaired without access both to the elements that make up a loop/transport combination as well as to the combination itself. Those issues are already separately before the Commission in its consideration of the conversion of special access services to unbundled elements. *See* Public Notice, CC Dkt. No. 96-98 (rel. Jan. 24, 2001).

robust competition. The Commission should therefore act now to eliminate, or at a minimum significantly limit, the obligation to provide unbundled local switching.

Sincerely,



Thomas J. Tauke
Senior Vice President
Public Policy & External Affairs



Michael E. Glover
Sr. Vice President &
Deputy General Counsel

Attachments

cc: D. Attwood

COMPETITIVE LOCAL SWITCHING IN VERIZON'S REGION

Competitive local exchange carriers in Verizon's region have deployed their own switches in large numbers. To date, CLECs have deployed approximately *940 known switches* — including more than 620 traditional circuit (or "voice") switches serving Verizon's territory nationwide, and at least 315 packet (or "data") switches that can be identified in just one Verizon East territory. *See* Table 1 & Appendix A.[1] In the Verizon East territory alone, the number of CLEC voice switches has increased by more than 75 percent in the last two years. *See* Figure 1. The number of CLEC data switches — many of which can be used to provide voice services — has grown even more rapidly, increasing by more than 275 percent in the Verizon East territory in the last two years. *See id.*

CLECs also are making extensive use of these switches. CLECs already are using their own switches to serve at least *four million* local lines in Verizon's region, including at least *half a million* lines provided to *residential* customers.

Moreover, CLECs are capable of using the switches they have already deployed to serve far more customers. CLECs have deployed both voice and data switches in hundreds of cities in Verizon's region, and are capable of serving the overwhelming majority of Verizon's customers. *See* Map 1. As demonstrated in Section I below, CLECs are currently using their voice switches to serve local customers in Verizon rate exchange areas that contain more than *88 percent* of Verizon's switched access lines. And the level of deployment in the most populous areas is especially large. In the 15 largest Metropolitan Statistical Areas ("MSAs") in which Verizon is the main incumbent local exchange carrier — all of which are located in Verizon East's territory, and which contain over 70 percent of Verizon East's switched access lines — there are an average of 18 CLEC voice switches and 17 CLEC data switches per MSA. *See* Table 1.

Altogether, more than *120 CLECs* of all sizes have actually deployed switches in Verizon's region. While the two largest CLECs (AT&T and WorldCom) account for more than 25 percent of all voice switches in Verizon's region, the next 15 largest CLECs account for an additional 37 percent of all voice switches. *See* Figure 2.[2] And with the exception of the two largest long distance carriers, these switch-based CLECs make virtually no use of unbundled switching (or the so-called UNE-platform).

Of course, even these figures relating to the scope of competitive switching are likely conservative, because they are drawn from public sources or from the necessarily limited data available to Verizon. CLECs do not typically disclose the full extent of their networks, or indicate the extent to which they serve customers using those networks. For example, in order to estimate the number of lines CLECs are serving with their own switches, we have used the

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[1] The number of CLEC data switches in this report include only those within Verizon East (*i.e.*, the former Bell Atlantic region). Totals for Verizon West (*i.e.*, the former GTE region) are unavailable because GTE typically serves only a part of a given city or metropolitan statistical area, and Verizon has no way to determine whether a CLEC data switch in that area serves the GTE territory in addition to (or in lieu of) the territory of the other incumbent LEC in that area.

[2] *See* New Paradigm Resources Group, Inc., *CLEC Report 2001*, Ch. 9 (14th ed. 2001) ("*NPRG CLEC Report 2001*").

number of E911 subscriber listings that competitors have obtained. This figure understates the number of lines served by CLEC switches, because there may be multiple lines associated with an individual E911 subscriber listing. But the fact that these figures are conservative only further underscores the breadth of the competitive switch deployment that already has occurred.

Figure 1. CLEC Switches in Verizon East's Region

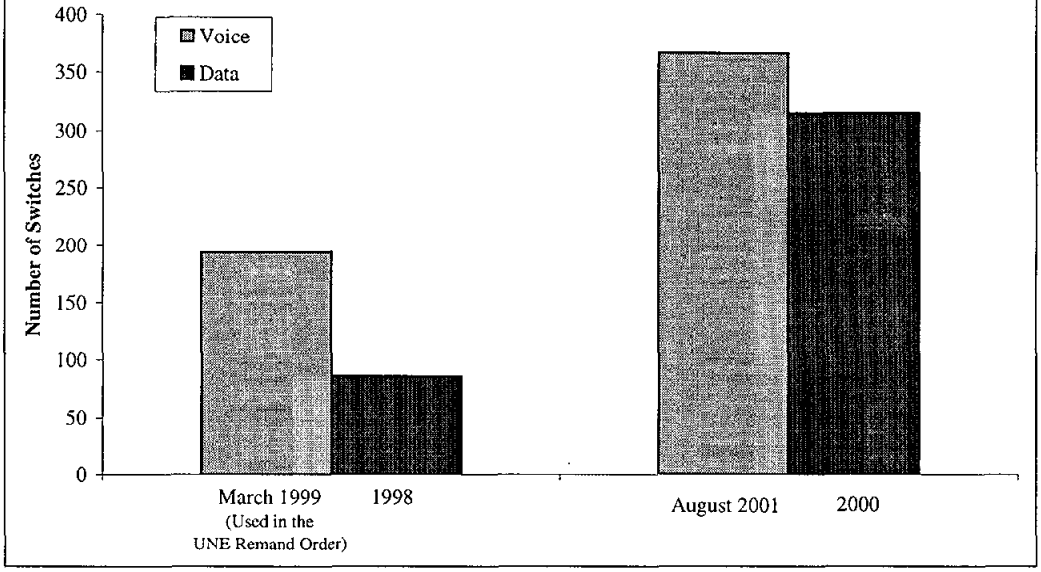
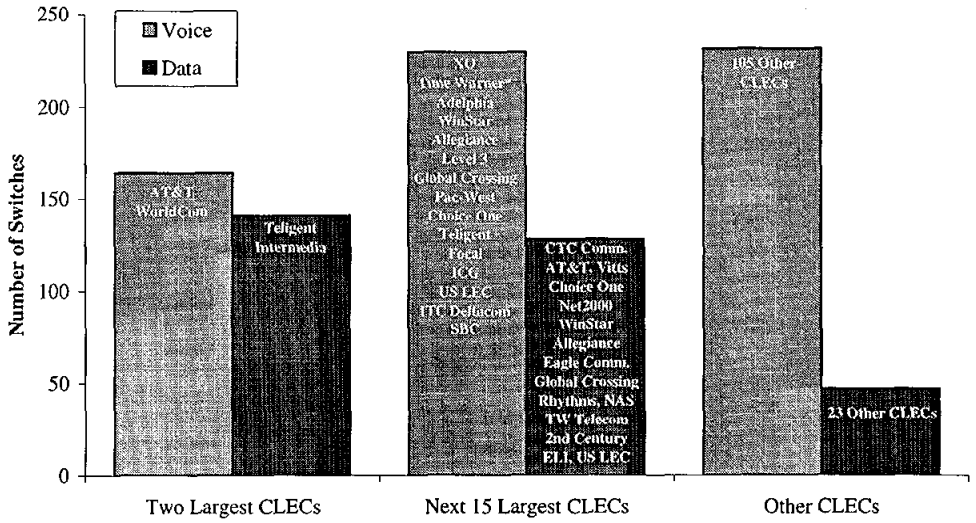


Table 1. CLEC Switches in Verizon's Total Region

	CLEC Switches		No. of CLECs with Switches	
	Voice	**Data**	**Voice**	**Data**
Verizon East	366	315	72	39
Verizon West	258	n/a	76	n/a
Total	624	315+	122	39+
MSA (U.S. rank)				
New York (2)	60	52	28	22
Boston (4)	34	41	21	16
Washington, DC (5)	38	60	26	16
Philadelphia (6)	39	36	24	17
Nassau-Suffolk (16)	11	5	8	3
Baltimore (18)	15	13	13	11
Pittsburgh (23)	14	11	11	9
Newark (27)	13	7	8	6
Norfolk-Virginia Beach-Newport News (40)	11	5	10	5
Bergen-Passaic (44)	4	0	4	0
Middlesex-Somerset-Hunterdon (51)	3	3	3	3
Monmouth-Ocean (52)	1	0	1	0
Buffalo-Niagara Falls (58)	7	8	4	5
Richmond-Petersburg (62)	10	5	8	4
Providence-Fall River-Warwick (67)	8	4	8	4

Figure 2. CLEC Switch Ownership in Verizon's Region



*Switches deployed by GST Telecom are attributed to Time Warner.

I. CLEC Circuit Switches.

By very conservative estimates, CLECs in Verizon's region are serving approximately *four million local lines over the circuit switches they have deployed.*[3] CLECs are using their switches to serve local customers in one of two ways. First, they are porting numbers from Verizon's switches to their own switches using local number portability ("LNP"). Second, they are using NXX codes obtained from the North American Numbering Plan administrator.

CLECs have ported approximately three million telephone numbers in Verizon's region. *See* Figure 3. This represents more than a 20-fold increase since 1998, the year that CLECs first began porting numbers in Verizon's region. *See id.*[4] In the last year alone, the number of CLEC ported numbers has grown by more than 80 percent, and CLECs continue to port new numbers at a rate of more than *150,000 per month. See id.*

Through August, CLECs in Verizon's region also had obtained approximately 13,000 NXX codes, giving them access to nearly 130 million telephone numbers. *See* Figure 4. This represents an increase of 125 percent since January 1999. *See id.* Based on the total number of local customers that CLECs are serving using their own switches, it appears that CLECs are serving at least one million customers using the NXX codes they have obtained (with the remainder served through ported numbers).[5]

Figure 3. CLEC Ported Numbers in Verizon East's Region

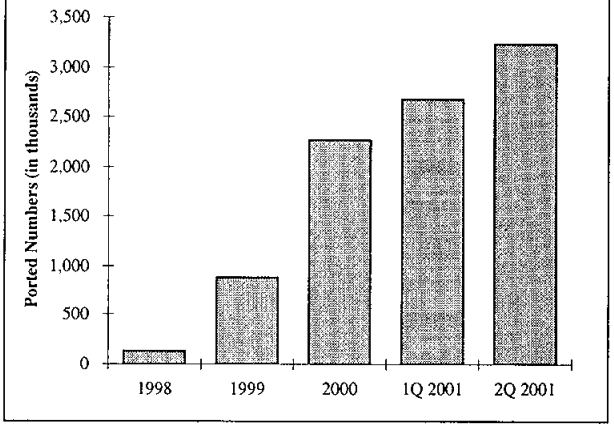
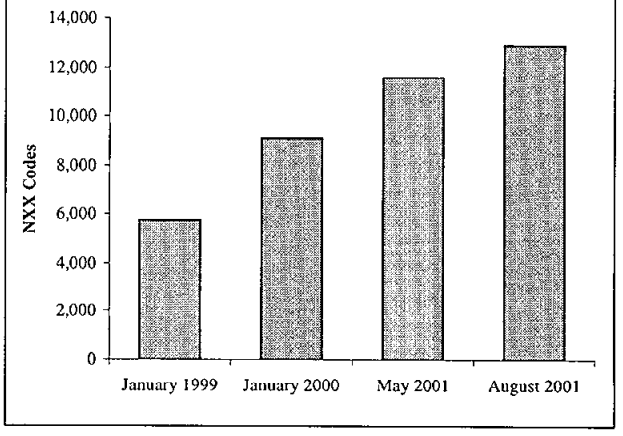


Figure 4. NXX Codes Assigned to Verizon Rate Centers



[3] As noted above, this figure is based on the number of E911 subscriber listings that competitors have obtained. In the substantial majority of cases, where a competitor has obtained an E911 listing for a customer, it serves that customer entirely over its own facilities. In all cases, however, the competitor is using at least its own switch to serve that customer. These figures are conservative. Each E911 subscriber listing necessarily represents 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 telephone lines.

[4] *See Telephone Number Portability*, Third Memorandum Opinion and Order on Reconsideration, 13 FCC Rcd 16090, 16091 ¶ 2, n.7 (1998) (requiring ILECs to implement LNP in all the 100 largest MSAs by December 31, 1998, and establishing procedures for CLECs to request LNP in smaller MSAs).

[5] This was derived by subtracting the three million ported numbers CLECs have obtained from the four million total facilities-based lines that CLECs are serving.

Moreover, CLECs are using their switches to serve not only business customers, but also residential customers. CLECs are serving at least *500,000 residential customers in Verizon's region using their own switches.*[6] CLECs are providing service to residential customers using their own switching facilities in every state in Verizon East's territory except one (West Virginia). *See* Table 2.

Many of the CLECs serving residential customers using their own switches are doing so using cable networks. In Verizon's region, for example, AT&T, Time Warner, Cablevision, Cox, and RCN are all providing local telephone service to residential customers over cable networks that have been equipped with circuit switches.[7] AT&T and Time Warner provides this in four Verizon East states, while Cablevision, RCN, and Cox each provide this in two.[8] CLECs without cable networks also are using their own switches to serve residential customers. For example, in Virginia, both Cavalier Telephone and ALLTEL provide facilities-based residential service.[9] So does Commonwealth Telephone (CTSI) in Pennsylvania and RCN in New York, Massachusetts, Pennsylvania, and Washington, D.C.[10] *See* Table 2.

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[6] As of June 2001, CLECs have obtained more than 2.4 million facilities-based and UNE-platform residential directory listings in Verizon East's region; as of this same date, CLECs were providing over 1.8 million residential lines using UNE platforms. Directory listings data provide a highly conservative measure of the number of residential lines CLECs are providing over their own facilities.

[7] *See AT&T Asks PUC to Ensure Flawed Bell Atlantic Systems Are Fixed to Make Way for Safe, Fair Local Phone Competition*, Cambridge Telecom Report (Jan. 17, 2000); Direct Testimony of Rochelle Jones on Behalf of Time Warner Communications Holdings, Inc., Cablevision Lightpath, Inc., Tele-Communications, Inc. and Cable Television and Telecommunications Association of New York, Inc., Consolidated Cases 95-C-0657, 94-C-0095, 91-C-1174, 2 (NYPSC July 3, 1996); Cablevision, *Broadband Communications: Optimum Telephone*, http://www.cablevision.com/company/index.html; Jim Robbins, President and Chief Executive Officer, Cox Communications, Inc., *Telecommunications Competition Is Flowing*, http://www.cox.com/corp/Competition.asp.; RCN Corporation, *Investor Info*, http://www.rcn.com/investor/index.html.

[8] AT&T provides residential service over its cable facilities in Massachusetts, Pennsylvania, New Hampshire, and Virginia. *See* AT&T, 10-K405 (SEC filed Apr. 2, 2001); AT&T News Release, *AT&T Broadband Introduces Local Telephone Competition to More Massachusetts and New Hampshire Communities* (Dec. 8, 2000). Time Warner provides residential service over its cable facilities in Maine and New York. *See* AOL Time Warner Press Release, *AOL Time Warner Holds First Meeting with Investors and Analysts in New York City Today* (Jan. 31, 2001). Cablevision provides residential service over its cable facilities in New York and Connecticut. *See* Cablevision, *Optimum Telephone*, http://www.cablevision.com/company/index.html. Cox provides residential service over its cable facilities in Virginia and Rhode Island. *See* Cox, *Cox Digital Telephone*, http://www.cox.com/Hamptonroads/; Cox, *Cox Digital Telephone: New England*, http://www.cox.com/NewEngland/Telephone/Default.asp; Cox, *Cox Digital Telephone: Rhode Island*, http://www.cox.com/NewEngland/NavIncludes/RI%20Calling%20Guide.pdf.

[9] V. Sinha, *$175 Million Pumped Into Richmond Phone Firm Competition Pleased That Investors Are Supporting Telecom*, Virginian-Pilot at D1 (Jan. 3, 2001); ALLTEL Press Release, *ALLTEL Offers Local Phone Service in Virginia Beach Area* (Jan. 10, 2000); ALLTEL Press Release, *ALLTEL Offers Single Connection That Saves Virginia Businesses Up to 30 Percent* (June 25, 2001).

[10] *See* CTE 2000 Annual Report at 20-22; CTE Press Release, *CTE Announces Restructuring of CTSI Subsidiary* (Dec. 6, 2000); *August 2001 LERG;* RCN Corp., Form 10-K405 (SEC filed Apr. 2, 2001).

Table 2. CLECs Providing Facilities-Based Residential Service		
CLEC	**State**	
ALLTEL	VA	"Alltel has begun marketing both residential and commercial services in the [Hampton Roads] region."
AT&T	MA, NH, PA, VA	"We have 848,000 cable telephony customers, and we plan to offer local residential service over DSL in the future."
BayRing	NH	Freedom Ring, d/b/a BayRing, "offers residential and business customers competitively priced local, long distance, Internet and dedicated access services." "BayRing owns and operates two CLASS 5 Digital Switches that are housed at the Pease International Tradeport in Portsmouth, NH. What separates us from our competition is the extensive fiber optic network that we've built throughout the Seacoast."
Cablevision	CT, NJ, NY	"Cablevision's circuit-switched residential service, Optimum Telephone, serves 11,000 subscribers with 20,000 access lines across 135,000 marketed homes."
Cavalier Telephone	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."
Conectiv	DE, MD, NJ, PA	"Conectiv Communications . . . uses its 730-mile fiber-optic network to provide telecom services, including local and long-distance phone service, as well as data and network services, to homes and businesses."
Cox	RI, VA	"'We expect to gain a million new customers this year,' said Joe Rooney, marketing vice president for Cox. These customers will choose from residential services that include . . . local and long distance telephone services under the Cox Digital Telephone brand"
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."
RCN	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."
Time Warner	ME, NY	"The trial of Time Warner Cable's local Internet telephone service has been expanded . . . based on the success of the initial test site in Portland, Maine. The service, which is called Line Runner, is being marketed to Road Runner customers, and has had an excellent acceptance rate among customers in Portland."

As the FCC has found, competition for switched services may be assessed by analyzing where CLECs have obtained NXX codes and ported numbers. Each NXX code and ported number is associated with a "rate exchange area" served by an incumbent LEC. Rate exchange areas are "geographically defined areas within which calls that originate and terminate (*i.e.*, remain within the area) are considered local calls."[11] In many areas there is an exact one-to-one correlation between incumbent LEC switches and rate exchange areas. In more densely populated urban areas, however, a single rate exchange area will more typically represent a tight geographic cluster of ILEC switches. As the FCC has recognized, the rate exchange areas where CLECs have obtained NXX codes and ported numbers are the areas where CLECs are using their own switches to compete directly with incumbent LECs.[12]

Using a combination of public sources and internal Verizon data it is possible to determine the precise rate exchange areas in which CLECs are using their switches to serve local customers.[13] 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. Verizon's internal records track the switches in its network from which CLECs have ported numbers. These internal data associate each ported number with a Verizon wire center[14] and the rate exchange area in which that wire center is located.[15]

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[11] Ind. Anal. Div., FCC, *Local Competition* at 41, n.17 (Dec. 1998).

[12] *See, e.g.*, Ind. Anal. Div., FCC, *Local Competition: August 1999* at 2, 43, Tables 4.1-4.3 & 5.1 (Aug. 1999) (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 NXX-based analysis for identifying "new entrants in the switched market."); *id.* ("A local service competitor that owns a switch must acquire a numbering code for that switch before commencing operation as a facilities-based CLEC providing mass market telephone service."); *Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, Third Report and Order and Fourth Further Notice of Proposed Rulemaking, 15 FCC Rcd 3696, ¶ 254 (1999) ("*UNE Remand Order*") (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).

[13] For purposes of this report we have not excluded 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 represent no more than 10 percent of the total counted for purposes of this report.

[14] A wire center is "the location of a local switching facility containing one or more central offices," and "wire center boundaries define the area in which all customers served by a given wire center are located." 47 C.F.R. § 54.5. A wire center "might have one or several class 5 central offices, also called public exchanges or simply switches." *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).

[15] The geographic boundaries of rate exchange areas and wire centers do not precisely overlap. Rather, there are often many wire centers within a single rate exchange area. Verizon maintains data that correlates wire centers with rate exchange areas.

These data demonstrate that CLECs are using their switches to serve local customers ubiquitously throughout Verizon's region. As of August 2001, CLECs were using their switches to serve local exchange customers in rate exchange areas that contain approximately *88 percent* of Verizon's switched access lines, including approximately *91 percent of all business lines* and approximately *87 percent of all residential lines. See* Table 3.[16] In the Verizon East territory, CLECs are using their switches to serve rate exchange areas that contain approximately 96 percent of Verizon's access lines, including approximately 96 percent of all business lines and approximately 96 percent of all residential lines. *See id.*

Because CLECs have targeted their local switches to serve the most populous rate exchange areas, the raw number of rate exchange areas that CLECs serve is somewhat lower than the number of lines to which their switches have access. But even these totals are considerable. As of August 2001, more than 49 percent of the rate exchange areas in Verizon's region were served by at least one CLEC voice switch. *See* Table 3 & Map 2.[17] Moreover, these totals are even higher in the largest metropolitan areas. The Verizon East territory is much more densely populated than the Verizon West territory, and has therefore attracted more competitive activity. In the 15 largest Metropolitan Statistical Areas ("MSAs") in which Verizon is the main incumbent local exchange carrier — all of which are located in Verizon East's territory, and which contain over 70 percent of Verizon East's switched access lines — more than 92 percent of the rate exchange areas were served by at least one CLEC voice switch; 85 percent were served by at least two; 77 percent were served by at least three; and 70 percent were served by four or more. *See id.* And overall, approximately 75 percent of all rate exchange areas in Verizon East are being served by at least one CLEC switch; 55 percent are served by at least two; 45 percent are served by at least three; and 37 percent are served by 4 or more.

[16] In other words, in the Verizon rate exchange areas that contain 88 percent of Verizon's switched access lines, at least one CLEC switch had an NXX code or ported number associated with each of those rate exchange areas.

[17] Approximately 32 percent of Verizon's rate exchange areas were served by at least two CLEC switches. *See id.* Twenty-five percent were served by at least three. *See id.* Approximately 20 percent were served by four or more. *See id.*

Table 3. Rate Exchange Areas Where CLECs Have Obtained Ported Numbers or NXX Codes								
	Percentage of Rate Exchange Areas Served by:				Percentage of VZ switched access lines in Rate Exchange Areas 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
Verizon East	75	55	45	37	96	92	87	84
Verizon West	25	11	7	5	69	60	53	48
MSA (U.S. rank)								
New York (2)	98	95	88	78	99	99	99	98
Boston (4)	100	96	88	87	99	98	98	97
Washington, DC (5)	69	60	53	51	76	76	73	73
Philadelphia (6)	98	95	88	81	99	99	97	96
Nassau-Suffolk (16)	100	97	91	83	100	99	99	99
Baltimore (18)	100	98	91	87	99	99	98	98
Pittsburgh (23)	91	71	54	43	99	96	90	86
Newark (27)	100	100	94	89	100	100	98	95
Norfolk-Virginia Beach-Newport News (40)	81	57	52	48	97	96	95	95
Bergen-Passaic (44)	100	100	93	79	97	97	95	92
Middlesex-Somerset-Hunterdon (51)	100	96	91	87	99	99	97	94
Monmouth-Ocean (52)	89	67	63	44	96	82	80	65
Buffalo-Niagara Falls (58)	63	50	38	38	95	93	90	90
Richmond-Petersburg (62)	81	73	73	58	99	97	97	94
Providence-Fall River-Warwick (67)	100	93	90	86	100	99	99	99

The percentage of rate exchange areas served by CLEC switches is a highly conservative measure of the extent to which CLECs serve — or have the ability to serve — customers using their own switches. *First*, the data are based only on conventional circuit switches, even though fax, e-mail, and data, along with a growing volume of voice traffic, too, are now being switched on packet rather than circuit switches. As described in Section II below, CLECs are rapidly deploying packet switches to provide data services, and also are increasingly using these switches to provide voice services.

Second, 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. [18] According to the LERG, for

[18] *UNE Remand Order* ¶ 261 (The Commission has indeed found that "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. If a competitor uses a single switch to serve a rate area consisting of 10-15 incumbent LEC

example, the average CLEC switch in Verizon's region had NXX codes serving seven rate exchange areas.[19]

Switch manufacturers have specifically designed their equipment to meet CLECs' needs to serve large geographic areas. Lucent's 5ESS — the most popular voice switch among CLECs — has "[r]emote switching capabilities" that make it possible to serve customers that are 2000 miles away from the host.[20] This provides CLECs with "a unique and very attractive low-cost solution . . . to support growth opportunities in startup areas where existing traffic may not justify installing a standalone" switch.[21] Nortel — the second most popular switch manufacturer among CLECs — offers remote switching capabilities that "[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 "[22] CLECs are using remote switching extensively. As of August 2001, for example, CLECs had deployed approximately 70 remote switches in addition to the more than 620 host switches they have deployed.[23]

CLECs may also extend their competitive reach by deploying new 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.[24] For example, the latest Lucent 5ESS switches have a completely modular design, which "allows growth in increments simply by adding modules."[25] Lucent enables CLECs to purchase switches with "only the capabilities and capacity you really need, minimizing life-cycle costs and maximizing investment returns."[26]

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switches, the average utilization of the competitor's one switch can be as high, or higher, than many, or even all, of the incumbent LEC switches."); *see also UNE Remand Order* ¶ 258 ("We find however, that 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.").

[19] Telcordia, *Local Exchange Routing Guide* (Aug. 2001) (*"August 2001 LERG"*).

[20] Lucent Technologies, *5ESS Switch*, http://www.lucent.com/products/solution/0,,CTID+2002-STID+10055-SOID+935-LOCL+1,00.html.

[21] 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.; *see also* Lucent Technologies, *Maximize Your Opportunities With the Remoting Capabilities of the 5ESS-2000 Switch*, http://192.11.229.2/knowledge/documentdetail/0,1494,inContentId+9370-inLocaleId+1,00.html. ("CLECs may therefore "establish a presence in a new or small market at minimal cost," and "without making major capital investments.").

[22] Nortel Networks, *DMS-10 Carrier Class Switching System, Remote Switching Center-S*, http://www.nortelnetworks.com/products/01/dms-10/rscs.html.

[23] Telcordia, *August 2001 LERG*.

[24] *See, e.g.*, 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, Switching Systems: Special Report*, http://www.clec.com (May 2001) ("Even the legacy switching products are consolidating common equipment into half as many cabinets and increasing port density on line and trunk modules.").

[25] Lucent Technologies, *5ESS Switch*, http://www.lucent.com/products/solution/0,,CTID+2002-STID+10055-SOID+935-LOCL+1,00.html.

[26] *Id.*

Nortel's DMS-10 is specifically "[d]esigned for small to medium applications"[27] by being "scale[d] for future growth," so that carrier can get "an immediate return on . . . investment."[28] Siemens's new EWSD SX switch is "finding great popularity with carriers of all sizes who need exceptional functionality on a smaller footprint."[29] Ericsson's new AXE Local 7 switch reduces "costs for installation, operation and maintenance" with hardware that "is smaller and requires less power" and with "new options for remote control save [that] time and money on service personnel."[30]

The fact that CLECs have been able to use their own switches to compete successfully in serving all the customers they wish to serve is further demonstrated by the fact that most switch-based CLECs make little or no use of unbundled switching from Verizon – either on a stand-alone basis, or as part of a so-called UNE platform. Apart from the nation's two largest long distance carriers (AT&T and WorldCom), there are only 11 CLECs in Verizon's region who have obtained unbundled platforms, and who also have deployed at least one switch. These 11 CLECs account for only 3 percent of all platforms, and only 0.2 percent of the platforms provided to residential customers. AT&T and WorldCom together account for approximately 73 percent of all platforms, including 83 percent of those used to serve residential customers. CLECs who have not deployed any switches of their own in Verizon East's territory account for an additional 22 percent of all platforms, including 17 percent of the platforms provided to residential customers. In sum, AT&T and WorldCom – together with CLECs that have not deployed a single switch of their own in Verizon's region – account for 95 percent of all platforms, including more than 99 percent of the platforms provided to residential customers.

Finally, as the Commission has repeatedly concluded, CLECs may obtain collocation space and unbundled local loops in a timely and cost-effective manner. In the *UNE Remand Order*, the Commission found that the time and costs associated with obtaining collocation space and local loops through the hot-cut process were the primary reasons it did not eliminate the unbundled switching requirement.[31] Since that time, however, the Commission itself has addressed these issues directly, for example by expanding the range of collocation options and imposing standard time limits.[32] Moreover, the facts show that any such concerns have been eliminated in Verizon's region. As the Commission has acknowledged, Verizon provides

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[27] Nortel Networks, *DMS-10 Carrier Class Switching System*, http://www.nortelnetworks.com/products/01/dms-10/index.html.

[28] Nortel Networks, *Differentiate Yourself with Nortel Networks' DMS -10 CLEC Switching Solution*, http://www.nortelnetworks.com/network/clec.html.

[29] Siemens Press Release, *Siemens Debuts Denser Version of Its World-Leading Class 5 Switch to Meet Service Demands and Space Limitation* (June 4, 2001).

[30] Ericsson Marketing Brochure, *AXE Local 7*, http://www.ericsson.com/multiservicenetworks/circuitswitching/axe/axelocal72/.

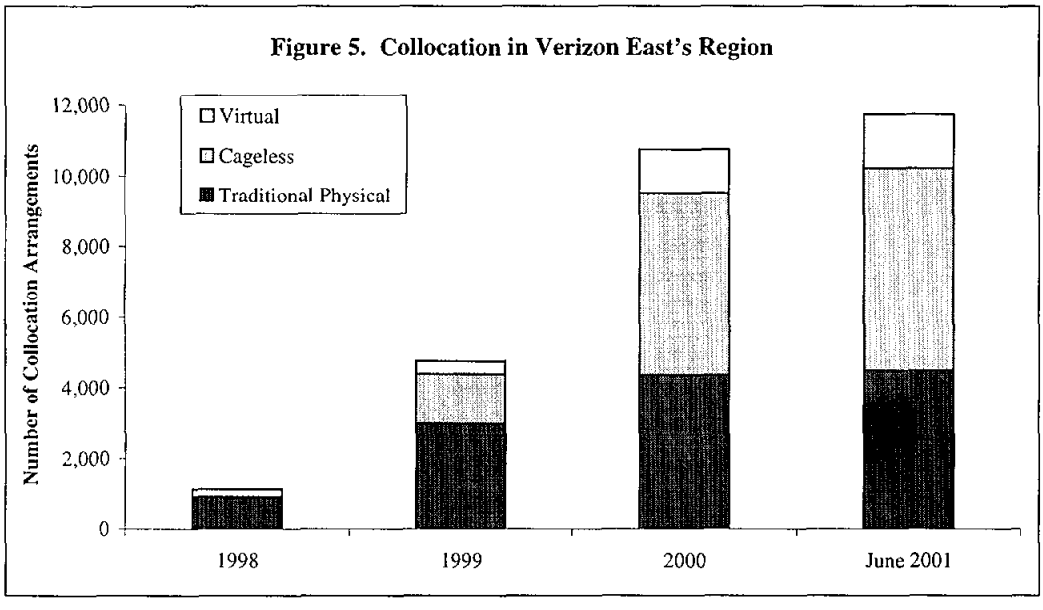
[31] *UNE Remand Order* ¶¶ 269-271.

[32] *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, CC Docket No. 98-147 (rel. Aug. 8, 2001).

collocation and hot-cuts to CLECs at a level that provides them with a "meaningful opportunity to compete."[33]

With respect to collocation, the FCC has found that Verizon is consistently providing collocation when CLECs request it.[34] Moreover, Verizon has expanded its collocation offerings to enable CLECs to obtain collocation in single-bay increments, which obviate the need to construct a cage. As a result of these steps, collocation in Verizon's region has exploded in the past two years. For example, at the end of 1998 CLECs had obtained 1,100 collocation arrangements in Verizon's region. See Figure 5. By June of this year, *CLECs had completed more than 11,700 collocation arrangements* — a nine-fold increase. *See id.*[35] These collocation arrangements are located in central offices that contain more than 90 percent of Verizon East's access lines — more than 94 percent of its business lines, and nearly 90 percent of its residential lines.

Figure 5. Collocation in Verizon East's Region



[33] *See, e.g., Application by Bell Atlantic New York for Authorization Under Section 271 of the Communications Act To Provide In-Region, InterLATA Service in the State of New York*, Memorandum Opinion and Order, 15 FCC Rcd 3953, ¶¶ 67, 291 (1999) ("*New York Order*"); *Application of Verizon New England Inc., et al., for Authorization To Provide In-Region, InterLATA Services in Massachusetts*, Memorandum Opinion and Order ¶ 182, CC Docket No. 01-9, FCC 01-130 (rel. Apr. 16, 2001) ("*Massachusetts Order*"); *Application of Verizon New York Inc., et al., for Authorization To Provide In-Region, InterLATA Services in Connecticut*, Memorandum Opinion and Order ¶ 45, CC Docket No. 01-100, FCC 01-208 ("*Connecticut Order*"); *Application of Verizon Pennsylvania Inc., et al., for Authorization To Provide In-Region, InterLATA Services in Pennsylvania*, Memorandum Opinion and Order ¶ 99, CC Docket No. 01-138 (rel. Sept. 19, 2001) ("*Pennsylvania Order*").

[34] *See, e.g., New York Order* ¶ 73; *Massachusetts Order* ¶ 194; *Connecticut Order* ¶ 45; *Pennsylvania Order* ¶ 99..

[35] Since June 2001, a number of CLECs have returned their existing collocation arrangements to Verizon, however, the fact that CLECs obtained such a high number of arrangements in the first place is proof that competitors can obtain collocation when they want it.

The availability in the market of alternatives to traditional collocation also have 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."[36] They permit CLECs to "easily connect with, and hand off traffic to, the IXCs and each other."[37] They allow "[m]ost new business telecom providers . . . to bypass the traditional infrastructure."[38] Today, there are alternative collocation providers throughout Verizon's region. *See* Appendix C.

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 Verizon's performance in providing hot-cuts to CLECs is excellent.[39] Indeed, while AT&T complained vigorously about Verizon's hot-cut performance during Verizon's section 271 application in New York in September 1999, it has been completely silent on this issue during each of Verizon's three subsequent applications. Nor has any other CLEC seriously disputed Verizon's hot-cut performance in any of the last three long distance applications that Verizon has filed. There is good reason for this: Verizon routinely fulfills hot-cut orders in a timely manner more than 95 percent of the time.[40] Indeed, Verizon's hot-cut processes and systems have performed so well that they earned the prestigious ISO 9000 certification from the International Organization for Standardization, an independent worldwide federation of national standards bodies that awards this certification to companies that demonstrate they meet the expectations of their customers.

Of course, CLECs may also connect their switches to their own loop facilities, rather than obtain unbundled loops from an ILEC. As described above, many cable companies in Verizon's region are already doing so. In addition, CLECs in Verizon's region have deployed extensive fiber-optic networks that they use to provide customers with high-capacity connections, completely bypassing Verizon's network. More than 30 CLECs in Verizon's region have deployed fiber networks. *See* Appendix D. These networks serve more than 25 cities. *See id.* In the 15 largest MSAs in which Verizon is the primary incumbent local exchange carrier — all of which are located in Verizon East's territory, and which contain over 70 percent of Verizon East's switched access lines – there are an average of eight CLEC fiber networks per MSA.

In addition, CLECs may increasingly obtain local fiber facilities from alternative wholesale suppliers, which typically sell or lease dark fiber to other carriers, but do not

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[36] D. Culver, *Construction Boom for Colocation,* Interactive Week (Mar. 13, 2000), http://www.zdnet.com/intweek/stories/news/0,4164,2468788,00.html.

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

[38] 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.

[39] *See, e.g., New York Order* ¶ 291; *Massachusetts Order* ¶ 159; *Connecticut Order* ¶ 13; *Pennsylvania Order* ¶ 86.

[40] *See, e.g., Massachusetts Order* ¶ 160; *Connecticut Order* ¶ 13; *Pennsylvania Order* ¶ 86.

themselves engage in the provision of telecommunications services. An industry coalition of these suppliers — the Coalition of Competitive Fiber Providers — states that their members' provide services "in virtually every region of the 'lower 48' states and the District of Columbia."[41] In Verizon's region, for example, there are at least eight such providers that have operational or planned fiber networks that they are leasing to CLECs. *See* Appendix E. For example, Allegiance has leased fiber from suppliers in 19 markets.[42] CTC recently 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."[43]

II. CLEC Packet Switches.

Data traffic overtook voice traffic on the phone network in 1998, and since that time the volume of data traffic has continued to grow much faster than voice.[44] Packet switches therefore already compete directly with circuit switches for at least one major segment of traffic. And as the Commission has found, CLECs stand on equal footing with ILECs in their ability to deploy and operate packet switches.[45]

Nationwide, CLECs have deployed more than 2,000 packet switches. *See* Figure 6. In Verizon East's territory, over 40 CLECs have deployed packet switches. *See* Appendix B. Since the beginning of 1999, the number of CLEC packet switches has increased by more than 210 percent nationwide. *See* Figure 6. And CLECs are deploying new packet switches even more rapidly than they are deploying voice switches.[46]

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[41] Coalition of Competitive Fiber Providers, Petition for Declaratory Ruling at 1, *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).

[42] Allegiance Telecom Inc., Form 10-K405 at 10 (SEC filed Mar. 29, 2000).

[43] *CTC Communications Announces Fully Funded Local Fiber Build-Out Plan; High Bandwidth Core Fiber Network to Be Extended to Verizon Local Switching Offices*, Business Wire (Dec. 19, 2000).

[44] *See, e.g.*, Address of William E. Kennard, Chairman, Federal Communications Commission, Comptel 1999 Annual Meeting and Trade Exposition, Atlanta, GA, 1999 FCC LEXIS 506 (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, Company Report — Avanex Corp., 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.").

[45] *See, e.g., UNE Remand Order* ¶ 306 ("the presence of multiple requesting carriers providing service with their own packet switches is probative of whether they are impaired without access to unbundled packet switching."); *id.* ¶ 307 ("Competitive LECs and cable companies appear to be leading 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.").

[46] The number of CLEC voice switches increased 43 percent in 1999 and 30 percent in 2000; the number of CLEC data switches increased 54 percent in 1999 and 104 percent in 2000. *See* New Paradigm Resources Group, Inc., *CLEC Report 2000*, Ch. 6 at Tables 6 & 8 (12th ed. 2000); *NPRG CLEC Report 2001*, Ch. 7 at Tables 6 & 8.

CLECs are using their extensive packet-switched networks to compete directly for the data services that incumbent LECs provide. *See* Table 4. According to the New Paradigm Resources Group ("NPRG"), CLECs earned more than *$20 billion* from the provision of data services in 2000. *See* Figure 7.[47] This represents a 100 percent increase from the previous year.[48] And, according to NPRG, CLECs are expected to earn close to $30 billion from the provision of data services in 2001.[49] The provision of data services is indeed the single largest source of revenue for CLECs. In 2001, data services are expected to comprise 57 percent of CLEC revenues, up from 52 percent the previous year.[50]

Figure 6. Growth of CLEC Packet Switches

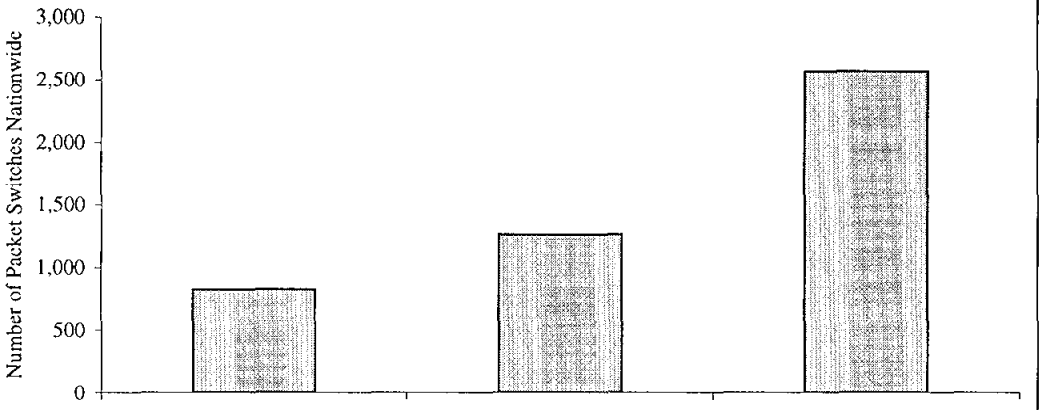


Table 4. CLEC Data Service Offerings

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."
Intermedia	"We are in the best position to internetwork our ATM and our award-winning frame relay service to bring you the power to offer video streaming, collaborative 3-D modeling, imaging systems and the numerous other applications that are shaping the communications industry."
Net2000	"Net2000's state-of-the-art network is comprised of both circuit (voice) and packet (data) switches, connected via fiber optic transport. Net2000 utilizes Nortel Networks DMS-500 voice switches and Nortel Networks

[47] *NPRG CLEC Report 2001*, Ch. 8 at Table 17. This category includes "all data and data-related services (*e.g.*, frame relay, ATM, and Internet access)." *Id.*

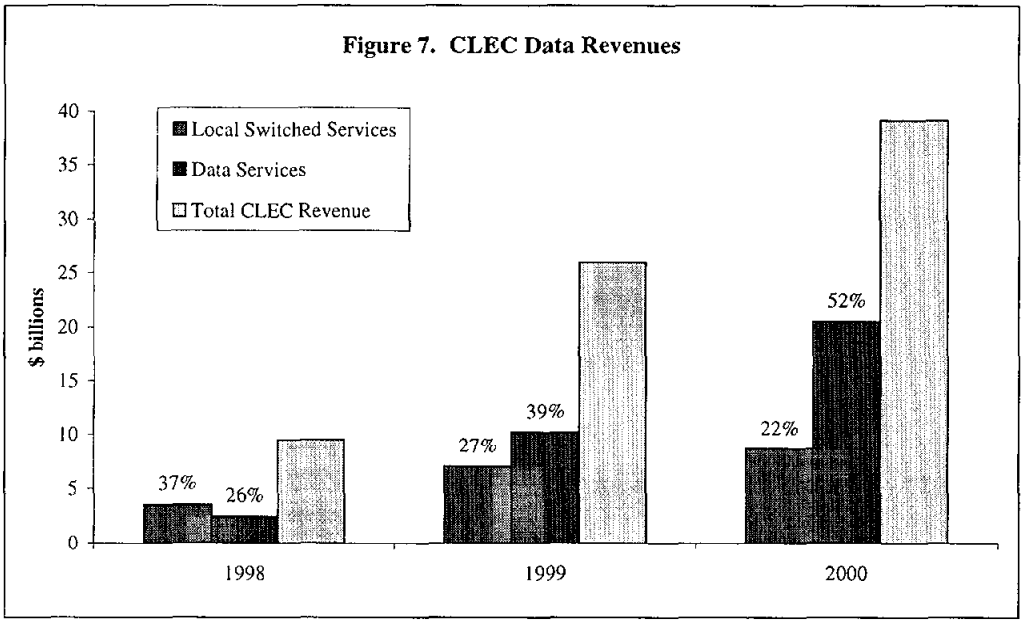
[48] *See id.*, Ch. 8 at Table 18.

[49] *See id.*

[50] *See id.*

	Passport data switches, which are currently deployed in 23 locations across the United States."
Teligent	"we use ATM switches and data routers along with Nortel DMS switches to hand off the traffic to other networks - the public circuit-switched voice network, the packet-switched Internet, and private data networks."
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 F.	

Figure 7. CLEC Data Revenues



CLECs are using their packet switches to compete with ILECs not only for data traffic, but also for voice traffic. As Lucent has recently stated, "[t]he migration from circuit to packet is underway. . . . Voice traffic is beginning to move from circuit-switched networks to data networks, including the Internet."[51] AT&T's general counsel, James Cicconi, has likewise observed that, "with the growth of services like IP telephony, there is no longer a clear distinction between 'voice' and 'data' transmissions."[52]

The migration of voice traffic to packet switches has indeed been occurring on long distance networks for several years.[53] In 1999, both AT&T and Sprint announced that they

[51] 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.

[52] *Prepared Testimony of James W. Cicconi, General Counsel and Executive Vice President, AT&T Corp., Before the House Committee on Commerce*, Federal News Service (Apr. 25, 2001).

[53] Level 3 designed its entire long distance network around packet switches from the ground up; it began wholesaling voice over IP long distance service in fourth quarter 1999 and now processes approximately 6 billion

would no longer purchase circuit switches for use in their long distance networks, but would instead purchase packet switches that "will allow data and voice to be carried on the same network more effectively."[54] AT&T and WorldCom have more recently launched retail voice-over-IP ("VOIP") services to business customers, which "marked the first instance of two major telecom companies visibly transitioning to all-data networking that supports voice services."[55]

Numerous carriers have now begun to migrate their *local* voice traffic onto packet networks as well.[56] *See* Table 5. Indeed, many of the data switches that CLECs have *already* deployed are capable of providing voice services. *See* Table 6. Cable operators also have been providing voice services over their networks. Cable operators have been offering cable telephony using circuit switches for several years. There are now more than 1.3 million cable telephony subscribers nationwide, and cable operators are adding new subscribers at the rate of 15,000 per week.[57] In addition, cable operators plan soon to begin providing voice services using IP-based networks. Cable operators have recognized that cable IP telephony will provide "a much more efficient way to compete in the voice market."[58] Time Warner has already begun trials of the service,[59] and AT&T has announced that it soon plans to begin testing IP equipment.[60]

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minutes per month of packet-switched voice and data calls. *See* A. Lindstrom, *Talkin' 'Bout Next-Generation Telcos*, Business Communications Review at 14 (May 1, 2001).

[54] *See* T.K. Horan, CIBC Oppenheimer, Investext Rpt. No. 2749262, Telecom Services: Daily Teletimes — Industry Report at *1 (Mar. 1, 1999) ("According to an article yesterday in the New York Times, 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."). 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." *Telephony*, Communications Daily (Apr. 14, 2000) (according to MCI Chief Technology Officer Fred Briggs)

[55] 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.

[56] *See* Lucent Technologies, *Circuit to Packet: Extending the Value of Class 4 and 5 Network Infrastructure in Metro/Edge Networks* at 1 (May 2001), http://www.lucent.com/businesspartners/clp/stories/circuit-to-packet.pdf (This migration "began in the core networks of backbone service providers and is now extending to the next most logical application area for performance and margin improvement, the metro/edge network . . . where . . . LECs, . . . CLECs, and Backbone Service Providers . . . create and provision services.") ; M.H. Reddig, *Top 10 Advances in Switching, Switching Systems, May 2001 Special Report*, http://www.clec.com ("Doug Green, vice president of marketing at Ocular networks, a Reston, Va-based developer of MAN technologies, says the changed [sic] from time-based architectures (such as TDM) to packet-based switching fabrics is 'probably the most significant change over the last few years.'"); *What is VoIP?* (Feb. 28, 2001), http://www.darwinmag.com/learn/curve/column.html?ArticleID=81 ("At first, only a few companies like Cisco and Lucent offered VoIP services, but the large telecommunications carriers — such as AT&T and Sprint — are catching on.").

[57] NCTA Press Release, *Cable Continues Rapid Deployment of Broadband Services* (Aug. 13, 2001).

[58] J. Barthold, *Jerry Kent*, Telephony (June 4, 2001).

[59] L. Cauley, *...Phones; Internet Telephony Has Been Slow in Coming, But It's About to Get a Big Boost*, Wall St. J. (June 25, 2001) ("Time Warner, the nation's No. 2 cable operator behind AT&T, has two IP trials running: in Rochester, N.Y., where Time Warner has been selling traditional circuit switched phone services for several years now, and Portland, Maine."). AOL Time Warner also has created a new Interactive Video division to speed up the

Table 5. 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."
Focal	"We've combined our expertise in voice circuit switching with our state-of-the-art DSL network to deliver our customers lightening fast Internet service and great quality voice over a single existing copper line."
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"; "The company plans to transfer its voice traffic from the circuit-switched network to the packet-based network by 2002."
Intermedia	"making an aggressive move to provide business customers with comprehensive Internet, voice and video service over its Internet (IP) network"; "has 200 data switches deployed across the U.S," which it uses to "provide voice to all of our customers in every market."
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."
Net2000	"[a]ll of [its] services will be based on an ATM . . . backbone, which is capable of carrying multiple services, including frame relay, IP and high-quality voice."
Sprint	Has invested $2 billion to construct its ION network, which will "carry pin-drop quality voice traffic over an ATM network and seamlessly connect to any public switched network."
US LEC	Added high capacity ATM data 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 F.	

deployment of advanced cable services, including cable IP telephony. *Broadband Video Initiative May Foil Pirates*, Communications Today (Aug. 20, 2001).

[60] L. Cauley, *...Phones; Internet Telephony Has Been Slow in Coming, But It's About to Get a Big Boost*, Wall St. J. (June 25, 2001) ("Mr. Starr says AT&T expects to begin testing IP components by various vendors within a year. Depending on how those tests go, he says AT&T could begin offering IP phone services to paying customers within 18 months.").

Table 6. Voice Capabilities of Packet Switches Deployed by CLECs in Verizon's Region	
Lucent/Ascend CBX 500 • Electric Lightwave; Intermedia; Global Crossing; Eagle Comm; US LEC; BTI; Time Warner; ChoiceOne; Lightship	"The CBX 500 blends IP, frame relay, and legacy voice and data service features almost perfectly for the mix of revenues and traffic we can expect in the next decade, and it throws in the best management features for the creation and maintenance of multiservice networks available anywhere at any price,"
Cisco BPX 8600/8800 • CTC; Allegiance	"The BPX 8600 Series IP + ATM switches provide the most scalable set of solutions to cost-effectively deliver ATM, Frame Relay, voice and circuit emulation services while supporting premium IP services such as intranets, extranets and IP VPNs." "With the BPX 8650, you can install an IP network and deliver advanced IP services, such as voice over IP, VPNs, and Web hosting services across the ATM backbone."
Nortel 7480 • Net2000	"Designed for the service provider environment, the versatile Passport 7400 switches are ideal for access adaptation and backbone switching—supporting ATM, frame relay, IP routing and switching, MPLS, circuit emulation, and voice services."
Siemens/Newbridge MainStreet Xpress • WinStar	"The MainStreetXpress 36130 ATM Services Access Multiplexer is the newest addition to the MainStreetXpress line of end-to-end, multiservices network solutions. This customer-located access multiplexer delivers legacy voice and data services on ATM networks."
Sources: See Appendix F.	

The migration of local voice traffic to packet switches is poised to increase much more rapidly in the very near future with the advent of a brand-new generation of packet switches that have recently come to market.[61] These new switches — commonly referred to as "softswitches" — enable voice, data, video and other services to be provided over a single piece of equipment far more efficiently than traditional switches.[62] As one CLEC notes, "[t]he most important development in switching over the past 3 years has been the rapid development, innovation and standardization of softswitches."[63] CLECs, equipment manufacturers, and industry analysts have all acknowledged that these new switches provide a complete "replacement" for Class 5 voice switches. *See* Table 7.

[61] Several recent technological advances are responsible for the emergence of softswitches. *See, e.g.*, Paul 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) ("Collecting all of these functions into one system is now possible because the underlying technology has matured rapidly. Microprocessors have increased in power to the point where vendors can construct an ATM switch or a Sonet multiplexer from a handful of special-purpose application-specific integrated circuits (ASICs). . . . In addition to the hardware improvements, the new systems take advantage of recent software advances. These systems rely on Web browsers for setup and configuration, so provisioning can be done via a simple drag-and-drop format.").

[62] *See, e.g.*, C. Wolter, *Softswitch Defined*, xchange, http://www.x-changemag.com/articles/051feat2.html (May 2000) (Jason Sayers, senior technologist at Williams, defines these new switches as "an application that is trying to emulate circuit switching using a packet-based infrastructure."); M.H. Reddig, *Top 10 Advances in Switching, Switching Systems, May 2001 Special Report*, http://www.clec.com (Mike Khalilian, senior director of technology, Time Warner Telecom, defines softswitches as "the all-encompassing terms that cover a whole range of next-generation telecom systems, all of which use open standards and decouple the service intelligence from the rest of the switch.").

[63] M.H. Reddig, *Top 10 Advances in Switching, Switching Systems, May 2001 Special Report*, http://www.clec.com (quoting Constantine Gavrilidis, Broadriver Communications."); *see also id.* ("Three years ago, softswitches were just a concept. Today they are an integral part of an important milestone in the history of telecommunications.").

Table 7. 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."

As WorldCom's Chief Technology Officer has noted, softswitches are "not pie in the sky," but rather "stuff that we are deploying *today*."[64] Indeed, numerous CLECs have already deployed softswitches and are using them to provide service. *See* Table 8. Some CLECs — including WorldCom, Time Warner Telecom, and Intermedia — initially began using softswitches to siphon Internet traffic off of their voice switches. *See id.* Many other CLECs have already begun using softswitches to provide voice services. *See id.* Among veteran CLECs, Focal Communications, Intermedia, XO, and Time Warner Telecom have all begun deploying softswitches to provide voice services. *See id.* Sprint "uses Telcordia's Class 5 softswitch today in bundled consumer and business applications as part of its Sprint ION initiative."[65] At least two new facilities-based CLECs — BroadRiver and CTC have designed their entire networks around the use of softswitches.[66] One CLEC (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."[67]

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[64] M. Johnson & D. Pappalardo, *WorldCom Sees Promise in Move to Softswitches*, Network World (Jan. 29, 2001) (According to Fred Briggs, CTO, WorldCom, softswitches enables WorldCom to "better support dial-up Internet access traffic over its voice network," because "[t]he new switches handle dial-up Internet traffic more cost-effectively than traditional Class 5 switches and have the capability to do voice over IP.").

[65] P. Bernier, *Softswitches Head for the Last Stretch: Are Class 5 Replacements Ready to Run?*, xchange, http://www.xchangemag.com/articles/161solutions4.html (June 1, 2001). As of late March [2000], "Sprint was in seven markets with the Telcordia Call Agent Class 5 softswitch offering VoIP," and "was in the midst of turning up an additional seven markets with the softswitch-based service." *Id.*

[66] M. Reddig, *Softswitches Emerge from the Shadows, Switching Systems, May 2001 Special Report*, http://www.clec.com ("Tom Buttermore, CEO of Alpharett, Ga-based competitive-communicaitons firm BroadRiver Communications, said the advent of softswitches was the main reason his company was formed."); *see* A. Lindstrom, *Talkin' 'Bout Next-Generation Telcos*, Business Communications Review at 14 (May 1, 2000) (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.).

[67] *See* M. Reddig, *Softswitches Emerge from the Shadows, Switching Systems, May 2001 Special Report*, http://www.clec.com (citing New Paradigm Resources Group, Inc.).

CLECs are increasingly relying on packet switches (including softswitches) because they are much cheaper to purchase and deploy than traditional circuit switches. *See* Table 9. As one analyst has noted, "packet telephony offers potential reductions of up to 50% in switch per-port costs" compared to traditional circuit switches."[68] This "[f]aster, cheaper, smaller, and more versatile switching equipment is transforming the central office."[69] Moreover, the price performance of an IP network "doubles . . . every 20 months."[70]

Packet switches are also easier to deploy and maintain than traditional circuit switches See Table 9. Packet switches also take up much less space than traditional switches, and "can result in a reduction of up to 90% in equipment space requirements."[71] Moreover, because the new generation of packet switches is capable of providing so many different types of services they reduce the need for extensive peripheral equipment that is associated with voice switches. *See* Table 9. At the same time, however, packet switches are capable of providing a much broader array of services than traditional circuit switches, and of providing services more efficiently. *See id.* And the new generation of packet switches also are capable of providing traditional services — like voice — at a level of quality and reliability that is comparable to traditional circuit switches.

Because packet switches are much cheaper and efficient than circuit switches, they enable much larger profit margins for existing CLECs.[72] They likewise enable many new CLECs that couldn't afford traditional voice switches to enter the market for the first time.[73] As noted above, several CLECs indeed attribute their facilities-based strategies entirely to the existence of new cost-effective softswitches. As one analyst has noted, "[n]ew business models

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[68] 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)

[69] *Id.*

[70] Wall St. Transcript Corp., Investext Rpt. No. 2003080, Analyst Interview: Telecommunications — Industry Report at *3-*4 (Sept. 22, 2000) (quoting Trent Spiridellis, Principal and Senior Equity Research Analyst, Banc of America Securities).

[71] 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).

[72] A. Lindstrom, *Talkin' 'Bout Next-Generation Telcos*, Business Communications Review at 14 (May 1, 2001) ("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.").

[73] J. Boyd, *The End of the Central Office*, http://www.internetwk.com/infastructure/infra081400-3.htm (Aug. 14, 2000) (citing Andrew Clay, Analyst, Aberdeen Group) ("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."); 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) ("Lower price-a key element to a startup-is a benefit with the new switches. A central office (CO) switch is a multimillion-dollar commitment, whereas the new systems can cost between one-half and one-tenth as much. The savings are possible because the new devices merge a variety of separate packet- and circuit-switched functions into one platform (see "Ordering a la Carte"). The idea is that costs are lower because operators are only adding functionality as they need it-and as the market justifies."); M. Reddig, *Softswitches Emerge from the Shadows, Switching Systems, May 2001 Special Report*, http://www.clec.com ("The economics and capabilities of softswithces make them ideal for very small carriers just entering the market and for carriers who serve smaller markets . . . In fact, they provide an opportunity for firms so small that they might not be able to enter the facilities-based market otherwise." (citing Tom Buttermore, CEO, BroadRiver Communications).

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. [Using softswitches], there's a very good chance some of these guys can arise from the ashes."[74]

As mentioned above, the major packet switch vendors have all developed voice capabilities for their packet switches. Cisco — the largest packet-switch supplier in the U.S. — has developed voice capabilities for over half of its product line.[75] The two largest circuit and switch manufacturers — Lucent and Nortel — have also developed softswitch products. *See* Table 10. Moreover, many new telecommunications equipment providers have emerged in the last few years — including Tachion, Axtar, Santera, Unisphere, Convergent Networks, Sonus, Tacqua, Syndeo, Convedia, Gallery IP Telephony, MetaSwitch, Sedona Networks, and Tellabs — to develop softswitch products as well. *See id.* According to Level 3, "[a]t least 22 vendors have introduced or plan to introduce Softswitch gateway controller technology," and at "least 20 vendors sell or plan to sell Softswitch gateway components"[76]

Based on all of this, analysts expect the market for packet switches and voice-over-IP services to grow very rapidly in the next few years. According to one recent analyst report, growth for packet-based voice equipment outpaced all other telecom gear in first half 2001.[77] 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.[78] Other analysts have made similar predictions.[79] The Yankee Group expects worldwide sales of softswitches to rise

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[74] A. Lindstrom, *Talkin' 'Bout Next-Generation Telcos*, Business Communications Review (May 1, 2001) (quoting P. William Bane, vice president of Mercer Management Consulting); *see also* M. Reddig, *Softswitches Emerge from the Shadows*, Switching Systems, May 2001 Special Report, http://www.clec.com ("If companies were able to offer voice and data services through one network at a quarter of the cost, the earlier network expansion that burdened CLECs with debt would not have happened.") (quoting New Paradigm Resources Group, Inc.); *id.* (quoting Greg Mycio, director of broadband analysis, New Paradigm Resources Group Inc.: "It seems that a lot of the financial, cash-burn issues that have been at the root of the difficulties of last year may not have occurred, or may not have occurred as quickly if companies were spending on next-gen types of platforms, softswitch types of platforms as opposed to class 5 platforms . . . because they're that much less expensive.").

[75] 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.").

[76] Ike Elliott, Senior Vice President, Softswitched Enabled Services, Level 3, *attached to* Form 8-K (SEC filed Feb. 7, 2000).

[77] Communications Daily at 4-5 (Aug. 28, 2001).

[78] *TIA Sees VoIP Nearly Doubling*, Telco Business Report (June 18, 2001).

[79] 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, growing at a CAGR of well over 50% annually, while key players are likely to experience growth rates in excess of 70%.); J. Duffy, *Cisco Pumps Up Voice-over-IP Product Family*, Network World (Dec. 4, 2000) (In the past year, the IP telephony market has grown to $60 million from $5 million, Synergy Research Group reports. Cisco's share of the market exceeded 60% in the third quarter, they say. Synergy expects the voice-over-IP market to exceed $250 million this year"); L.M. Harris, Josephthal, Investext Rpt. No.

from $16 million in 1999 to $824 million in 2003.[80] 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."[81]

Table 8. CLECs Deploying Softswitches

CLEC	Softswitch Deployment
2nd Century	"using the MainStreetXpress 36170 switch from Siemens . . . and the PathMinder softswitch from TeraBridge Technologies Corp."
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."
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."
Intermedia	"the company plans to use the softswitches to expand voice service into the Tier 2 markets where it currently offers data-only service."
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."
Qwest	"'Qwest's strategy is to integrate Internet, voice and data applications to deliver truly converged, collaborative services, and our work with Sonus is advancing that strategy'... Qwest is building its next-generation voice network using Sonus' . . . INtelligentIP Softswitch . . . [and] the PSX6000 SoftSwitch."
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."

Sources: See Appendix F.

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.").

[80] 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).

[81] M. Reddig, *Softswitches Emerge from the Shadows*, Switching Systems, May 2001 Special Report, http://www.clec.com (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.").

Table 9. 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.'"

Table 10. 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."
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."
Sources: See Appendix F.		

APPENDIX A. VOICE SWITCHES

Voice Switches Serving Verizon Rate Centers				
State	**CLEC**	**Switch Type**	**City**	**Street**
AL	BellSouth	D12	Anniston	1325 Noble St
AL	AT&T	DMH	Birmingham	2101 6th Ave N
AL	ITC Deltacom	DM5	Birmingham	900 Appalachee St
AL	ITC Deltacom	DS	Dothan	2304 Industrial Rd
AL	SPJ	CSX	Dothan	303 N Lena St
AL	Wiregrass Telcom	EWS	Dothan	206 West Troy Street
AL	ITC Deltacom	DS	Huntsville	8600 S Memorial Pky
CA	ICG	5E	Alhambra	2300 W Valley Blvd
CA	Cox	5E	Aliso Veijo	17 Journey St
CA	AT&T	5E	Anaheim	217 N Lemon St
CA	FirstWorld	NT5	Anaheim	1520 S Lewis St
CA	Global Crossing	DS	Anaheim	2461 W La Palma Ave
CA	WorldCom	DE4	Anaheim	905 East Discovery Lane
CA	SBC	5E	Arroyo Grande	225 N Halcyon Rd
CA	Pac-West Telecomm	DX6	Bakersfield	1430 Truxton Ave
CA	Mpower Communications	DMS	Bellflower	16730 Bellflower Blvd
CA	SBC	5E	Burbank	280 E Palm Av
CA	Pac-West Telecomm	DX6	Chico	1306 W 8th Ave
CA	SBC	5EH	Colton	433 N La Cadena Dr
CA	WinStar	5E	Covina	160 E Badillo St
CA	Pointe	NT5	El Monte	11025 Valley Blvd
CA	SBC	5E	El Monte	3614 N Center Av
CA	Pac-West Telecomm	DX6	Fresno	1455 Van Ness Ave
CA	SBC	5E	Gardena	16208 S. Vermont Av
CA	WorldCom	NT5	Irvine	17642 Armstrong Ave
CA	ICG	5E	Lakewood	4007 Paramount Blvd
CA	XO	DMS	Long Beach	200 Pine Ave
CA	Adelphia	5EH	Los Angeles	611 W 6th St & Use This One
CA	Allegiance Telecom	5E	Los Angeles	818 W 7th St., Suite 320
CA	AT&T	5E	Los Angeles	700 S Flower St
CA	AT&T	5E	Los Angeles	420 S Grand Ave
CA	Focal Communications	NT5	Los Angeles	1200 W 7th St
CA	ICG	5E	Los Angeles	1905 Armacost Ave
CA	Level 3	EN4	Los Angeles	818 W 7th St
CA	Net2000	DM5	Los Angeles	530 W 6th St
CA	North County Communications	DMH	Los Angeles	624 South Grand
CA	Pac-West Telecomm	DX6	Los Angeles	624 S Grand Ave
CA	PaeTec	VCD	Los Angeles	530 W 6th St
CA	Teligent	NT5	Los Angeles	1200 W 7th St
CA	Time Warner	DM5	Los Angeles	3700 Wilshire Blvd
CA	U.S. Telepacific	5E	Los Angeles	800 W 6th St, Suite 300, 3rd Floor
CA	Urjet Backbone Network	DM5	Los Angeles	624 S Grand Ave 11th Floor
CA	WorldCom	DE4	Los Angeles	609 W 7th Ave
CA	WorldCom	AXT	Los Angeles	1149s Broadway St
CA	SBC	5E	Napa	1300 Clay St
CA	SBC	5EH	Newhall	24705 N Newhall Av
CA	Pac-West Telecomm	DX6	Oakland	1624 Franklin St
CA	ICG	5E	Ontario	1471 Valencia Pl

Voice Switches Serving Verizon Rate Centers				
State	**CLEC**	**Switch Type**	**City**	**Street**
CA	AT&T	4E	Oxnard	1050 S C St
CA	Pac-West Telecomm	DX6	Palm Springs	295 N. Sunrise Way
CA	SBC	5E	Paramount	15706 S Paramnt Bl
CA	Mpower Communications	DMS	Pomona	362 E 4th St
CA	SBC	5E	Rialto	495 S Riverside Av
CA	Time Warner	DM5	Riverside	1110 Palmyrita Ave
CA	AT&T	5E	Sacramento	603 S St
CA	Pac-West Telecomm	DX6	Sacramento	770 L St
CA	AT&T	4E	San Bernardino	455 2nd St
CA	AT&T	5E	San Francisco	1 Bush St
CA	AT&T	NT5	San Francisco	360 Spear St
CA	Focal Communications	DM5	San Francisco	650 Townsend St
CA	North County Communications	DMH	San Francisco	98 Battery St
CA	Time Warner	DM5	San Francisco	501 2nd St
CA	WorldCom	DE4	San Francisco	274 Brannan St
CA	ICG	5E	San Jose	190 Park Center Plaza
CA	Pac-West Telecomm	DX6	San Jose	333 W Santa Clara St
CA	SBC	5E	San Jose	20 W Chynoweth Av
CA	Pac-West Telecomm	DX6	San Luis Obispo	872 Morro St
CA	Time Warner	DM5	San Luis Obispo	3050 Broad St
CA	Allegiance Telecom	5E	Santa Ana	1251 E Dyer Rd
CA	SBC	5E	Santa Ana	3220 S Bristol St
CA	XO	NT5	Santa Ana	1924 E Deere Ave
CA	AT&T	5E	Sherman Oaks	14800 Ventura Blvd
CA	SBC	5E	Simi	2692 Los Angeles Av
CA	Pac-West Telecomm	DX6	Stockton	4210 Coronado Ave
CA	Time Warner	DMS	Walnut Creek	1340 Treat Blvd
CA	SBC	5E	West Los Angeles	2010 Century Prk E
DC	Allegiance Telecom	5E	Washington	1120 Vermont Ave Nw
DC	Allegiance Telecom	5E	Washington	1120 Vermont Ave Nw
DC	Arbros Communications	5E	Washington	1201 L St Nw
DC	AT&T	5E	Washington	725 13th St.
DC	AT&T	4E	Washington	30 E St Sw
DC	AT&T	DMH	Washington	1331 F St Nw
DC	Focal Communications	NT5	Washington	1120 Vermont Ave Nw
DC	Global Crossing	NT5	Washington	1220 L St N.W.
DC	Net2000	DM5	Washington	1275 K St
DC	Teligent	NT5	Washington	1120 Vermont Ave Nw
DC	WinStar	5E	Washington	1850 M St Nw
DC	WinStar	VCD	Washington	1850 M St Nw
DC	WorldCom	NT5	Washington	120 Ingraham St Ne
DC	XO	DMS	Washington	4301 Connecticut Ave Nw
DE	Conectiv	DMH	Newark	500 N Wakefield Dr
FL	KMC Telecom	5E	Clearwater	12690 44th St N
FL	AT&T	5E	Jacksonville	424 Pearl St
FL	City of Lakeland	EWSD	Lakeland	1000 E. Parker St
FL	KMC Telecom	5E	Sarasota	6288 Tower Ln
FL	Allegiance Telecom	5E	Tampa	8230 E Broadway Ave
FL	AT&T	4E	Tampa	2261 Massaro Blvd

Voice Switches Serving Verizon Rate Centers				
State	**CLEC**	**Switch Type**	**City**	**Street**
FL	AT&T	5E	Tampa	6015 Benjamin Rd
FL	BTI	VCD	Tampa	400 N Tampa St
FL	E.spire	5EH	Tampa	111 Madison St
FL	Florida Digital Network	NT5	Tampa	610 E Zack St
FL	Florida Digital Network	DMH	Tampa	655 N Franklin St
FL	Global Crossing	NT5	Tampa	400 N Tampa St
FL	Interloop	5E	Tampa	3403 Orient Rd
FL	Intermedia	DMT	Tampa	3502 Queen Palm Dr
FL	ITC Deltacom	DS	Tampa	655 N Franklin St
FL	ITC Deltacom	DS	Tampa	655 N Franklin St
FL	ITC Deltacom	DS	Tampa	655 N Franklin St
FL	ITC Deltacom	DS	Tampa	655 N Franklin St
FL	Level 3	EN4	Tampa	7909 Woodland Center Blvd
FL	Mpower Communications	NT5	Tampa	655 N Franklin St
FL	National Telecommunications	DM2	Tampa	412 E Madison St
FL	SBC	5E	Tampa	12463 Telecom Dr
FL	Time Warner	5E	Tampa	5113 Ehrlich Rd
FL	Urban Media	NT5	Tampa	7808 Woodland Center Blvd
FL	US LEC	5E	Tampa	400 N Tampa St
FL	WinStar	VCD	Tampa	4200 W Cypress St
FL	WorldCom	DE4	Tampa	1000 North Ashley Dr., 9th Fl
FL	WorldCom	DMH	Tampa	8212 Woodland Center Blvd
FL	XO	DM5	Tampa	5904a Hampton Oaks Pky
FL	XO	DS	Tampa	5904a Hampton Oaks Pky
FL	Florida Cnsld Multi-media Services	CSX	Temple Terrace	8800 Boardwalk Trail Dr
FL	NewSouth Communications	5E	Winter Haven	200 Ave B
HI	Time Warner	DM5	Honolulu	737 Bishop St
HI	Time Warner	5E	Mililani	200 Akamainui St
IL	AT&T	5E	Chicago	717 S Wells St
IL	RCN	NT5	Chicago	350 N Orleans St
IL	Aero Communications	CSX	Freeport	210 W Spring St
IN	AT&T	5EH	Evansville	133-135 Nw 5th St
IN	Choice One	5E	Fort Wayne	2730 E Coliseum Blvd
IN	Indigital	EWSD	Fort Wayne	5312 West Washington Center Road
IN	KMC Telecom	5E	Fort Wayne	1710 Directors Row
IN	Choice One	5E	Indianapolis	701 W Henry St
IN	Time Warner	5E	Indianapolis	1465 Gent Ave
IN	Shirley Telephone	DE5	Mccordsville	6061 W. Pendleton Pike, Rd. 67
KY	BellSouth	5EH	Georgetown	314 Broadway
KY	Adelphia	5E	Lexington	565 W Main St
KY	Mikrotec Communications	D12	Lexington	1001 Winchester Rd
KY	NewSouth Communications	POI	Lexington	151 S Martin Luther King Blvd
KY	Touchtone Communications	D12	Lexington	250 W Main St
MA	WorldCom	NT5	Acton	31 Nagog Park
MA	Allegiance Telecom	5E	Boston	451 D St
MA	AT&T	5E	Boston	230 Congress St
MA	AT&T	5E	Boston	230 Congress St
MA	AT&T	NT5	Boston	451 D St
MA	Global Crossing	NT5	Boston	230 Congress St

Voice Switches Serving Verizon Rate Centers				
State	**CLEC**	**Switch Type**	**City**	**Street**
MA	PaeTec	5E	Boston	230 Congress St
MA	WinStar	5E	Boston	99 Summer St
MA	WorldCom	NT5	Boston	800 Boylston St
MA	XO	DS	Boston	1 Summer St
MA	AT&T	5E	Cambridge	250 Bent St
MA	Focal Communications	NT5	Cambridge	One Main St
MA	Intermedia	NT5	Cambridge	179 5th St
MA	Level 3	EN4	Cambridge	300 Bent St
MA	Network Plus	5E	Cambridge	185 Bent St
MA	WorldCom	DMH	Cambridge	300 Bent St
MA	XO	NT5	Cambridge	89 Fulkerson St
MA	Broadview	NT5	Charlestown	500 Rutherford Ave Suite 202
MA	Net2000	NT5	Charlestown	500 Rutherford Ave
MA	Teligent	NT5	Charlestown	500 Rutherford Ave
MA	Teligent	NT5	Charlestown	500 Rutherford Ave
MA	AT&T	5E	Foxboro	85 E. Belcher Rd
MA	AT&T	5E	Framingham	825 Waverly Street
MA	AT&T	5E	Framingham	825 Waverly St
MA	Comav	DCO	Framingham	111 Speen St
MA	NECLEC	DMS10	Hingham	190 Old Derby St
MA	AT&T	5E	Lowell	12 Washer St
MA	AT&T	5E	Marlboro	19 Brigham St
MA	Conversent	5E	Needham	95 Wexford St
MA	Global NAPs	DM5	Quincy	10 Merrymount Rd
MA	Richmond Connections	DMT	Richmond	Canaan Rd & Richmond Rd
MA	Adelphia	DS	Somerville	70 Innerbelt Rd
MA	RCN	5E	South Boston	105 W 1st St
MA	AT&T	4E	Springfield	351 Bridge St
MA	AT&T	5EH	Springfield	1441 Main St
MA	Choice One	5E	Springfield	1 Federal St - Building 111-3
MA	Global NAPs	DMS	Springfield	1441 Main St
MA	Lightship Telecom	DMS1	Springfield	1 Federal St @ Bldg 111
MA	NECLEC	DMH	Springfield	167 Market Pl.
MA	WorldCom	5EH	Springfield	1 Federal St
MA	SBC	DS	Waltham	190 Second Ave
MA	WorldCom	AXT	Waltham	580 Winter St
MA	Global Crossing	NT5	Westfield	8 Williams Way
MA	AT&T	4E	Worcester	175 Main St
MA	Choice One	5E	Worcester	474 Main St
MA	Conversent	5E	Worcester	90 Washington St
MA	Lightship Telecom	DMS	Worcester	44 Front St
MD	Allegiance Telecom	5E	Baltimore	100 S Charles St
MD	AT&T	4E	Baltimore	323 N Charles St
MD	AT&T	DMH	Baltimore	25 S Charles St
MD	Comcast	NT5	Baltimore	8031 Corporate Dr
MD	Corecomm (ATX)	DMH	Baltimore	200 E Lexington St
MD	Global Crossing	NT5	Baltimore	1628 St Paul St
MD	Level 3	EN4	Baltimore	300 W Lexington St
MD	Net2000	DM5	Baltimore	300 W Lexington St

Voice Switches Serving Verizon Rate Centers				
State	**CLEC**	**Switch Type**	**City**	**Street**
MD	WinStar	5E	Baltimore	201 N Charles St
MD	WorldCom	NT5	Baltimore	111 Market Pl
MD	WorldCom	DMH	Baltimore	900 Fleet St
MD	XO	DMS	Baltimore	300 W Lexington St
MD	AT&T	NT5	Columbia	9151 Rumsey Rd
MD	US LEC	5E	Columbia	6940 Columbia Gateway Dr
MD	New Frontiers Telecommunications	DS	Hagerstown	19776 Longmeadow Rd
MD	SBC	5E	Hanover	7150 Standard Dr
MD	KMC Telecom	5E	Ijamsville	3005 Big Woods Rd
MD	RCN	5E	Lanham	10000 Derekwood Ln
MD	E.spire	5E	Laurel	14405 Laurel Pl
MD	E.spire	5E	Laurel	14405 Laurel Pl
MD	Broadstreet	VCD	Linthicum Heights	989 Corporate Blvd
MD	AT&T	4E	Monrovia	11026 Fingerboard Rd
MD	Advanced Telcom Group	5EH	Rockville	515 Dover Rd
MD	Conectiv	DMH	Salisbury	128 E Church St
ME	Fairpoint	EWSD	Fryeburg	9 Mi E Of Conway Nh
ME	Mid-Maine Communications	DMT	Kenduskeag	646 Kenduskeag Rd
ME	Oxford Networks	DS	Norway	27 Fair St
ME	AT&T	POI	Portland	45 Forest Ave
ME	CRC Communications	DMT	Portland	92 Oak St
ME	Lightship Telecom	DMT	Portland	1 City Ctr
ME	WorldCom	5E	Portland	380 Cumberland(Nynex) Ave
MI	TC3 Telecom	5E	Adrian	1114fS Winter St
MI	AT&T	NT5	Detroit	445 State St
MI	Phone Michigan	5E	Flint	4074 S Linden Rd
MI	ACD Telecom	DS	Meridian Twnshp	4976 Northwind Dr
MI	Winn Telephone Company	5E	Mount Pleasant	402 N Mission St
MI	MichTel	EWSD	Pontiac	10 W Huron St
MI	XO	DM5	Southfield	21555 Melrose Avenue, Bldg 8
MI	AT&T	5E	Westland	38205 N Executive Dr
MO	AT&T	5E	Creve Coeur	11840 Borman Dr
MO	Navigator Telecommunications	CSX	O'fallon	1 Prairie Point Dr
NC	ITC Deltacom	DS	Asheville	24 O Henry Ave
NC	BellSouth	DMH	Cary	401 N Acadamy St
NC	BTI	VCD	Charlotte	701 E Trade St
NC	CTC Exchange Services Inc.	DM5	Charlotte	401 S College St
NC	ICG	5E	Charlotte	401 S College St
NC	NewSouth Communications	5E	Charlotte	301 S Mcdowell St
NC	Time Warner	5E	Charlotte	1500 N Sharon Amity Rd
NC	US LEC	5E	Charlotte	222 S Caldwell St
NC	ITC Deltacom	DS	Durham	2003 E Ushwy 54
NC	Time Warner	5E	Durham	924 Ellis Rd
NC	Madison River Communications	NT5	Morrisville	5150 Mccrimmon Pky
NC	WorldCom	NT5	Morrisville	1500 Perimeter Park Dr
NC	Adelphia	5E	Raleigh	1918 Wake Forest Rd
NC	AT&T	NT5	Raleigh	128 W Hargett St
NC	US LEC	5E	Raleigh	2201 Brentwood Rd
NH	AT&T	4E	Manchester	25 Concord St

Voice Switches Serving Verizon Rate Centers				
State	**CLEC**	**Switch Type**	**City**	**Street**
NH	Choice One	5E	Manchester	25 Sundial Ave
NH	Fairpoint	EWSD	Manchester	136 Lowell St
NH	Fairpoint	EWSD	Manchester	1 Sundial Ave
NH	Level 3	EN4	Manchester	1 Sundial Ave
NH	Lightship Telecom	DMT	Manchester	55 Bridge St
NH	WorldCom	5E	Manchester	1100 Elm St
NH	Conversent	5E	Nashua	145 Temple St
NH	WorldCom	5EH	Nashua	97 Main St
NH	Freedom Ring	D12	Portsmouth	11 Manchester Sq
NJ	AT&T	4E	Camden	12 N 7th St
NJ	AT&T	5E	Camden	12 N 7th St
NJ	AT&T	NT5	Camden	12 N 7th St
NJ	AT&T	5E	Cedar Knolls	88 Horse Hill Rd
NJ	AT&T	4E	Freehold	175 W Main St
NJ	Conversent	5E	Hackensack	66 Green St
NJ	AT&T	4E	Hamilton Square	1300 White Horse-Hmltn Sq
NJ	Focal Communications	NT5	Jersey City	287-309 @Washington St
NJ	Focal Communications	NT5	Jersey City	1 Evertrust Plz
NJ	Time Warner	POI	Jersey City	1 Evertrust Plz
NJ	WorldCom	AXT	Jersey City	101 Hudson St
NJ	WorldCom	DMH	Laurel Springs	29-35 Broadway Ave
NJ	Comcast	NT5	Moorestown	650 Centerton Rd
NJ	WinStar	5E	New Brunswick	18 Paterson St
NJ	WorldCom	NT5	New Brunswick	23 Home News Row
NJ	AT&T	NT5	Newark	95 William St
NJ	AT&T	5E	Newark	95 William St
NJ	AT&T	POI	Newark	95 William St
NJ	Global Crossing	NT5	Newark	1085 Raymond Blvd
NJ	Global NAPs	NT5	Newark	744 Broad St
NJ	Teligent	NT5	Newark	95 William St
NJ	WinStar	5E	Newark	95 William St
NJ	WinStar	DS	Newark	165 Halsey St
NJ	WorldCom	DMS	Newark	131 Market St
NJ	XO	NT5	Newark	165 Halsey St
NJ	XO	DS	Newark	165 Halsey St
NJ	Cablevision Lightpath	5E	Parsippany	6 Eastmans Rd
NJ	Snip Link	5E	Pennsauken	100a Twinbridge Dr
NJ	Adelphia	5E	Piscataway	225 Old New Brunswick Rd
NJ	AT&T	4E	Rochelle Park	75 W Passaic St
NJ	SBC	5E	Rochelle Park	120 W Passaic St
NJ	Allegiance Telecom	5E	Secaucus	110 Meadowlands Pky
NJ	Teligent	NT5	Trenton	50 W State St
NJ	Level 3	EN4	Weehawken	300 Boulevard E
NV	Pac-West Telecomm	DX6	Reno	50 W Liberty St Ste 1200
NY	AT&T	4E	Albany	158 State St
NY	AT&T	5E	Albany	158 State St.
NY	AT&T	5EH	Albany	99 Washington Ave
NY	Choice One	5E	Albany	80 State St
NY	Global Crossing	NT5	Albany	11 N Pearl St

Voice Switches Serving Verizon Rate Centers				
State	**CLEC**	**Switch Type**	**City**	**Street**
NY	Mid-Hudson	D12	Albany	11 N Pearl St
NY	PaeTec	VCD	Albany	1 Commerce Plz
NY	WorldCom	AXT	Albany	99 Washington Ave
NY	Cablevision Lightpath	5E	Bethpage	1111 Stewart Ave
NY	Time Warner	DRM	Binghamton	144 Henry St
NY	Global Crossing	NT5	Brentwood	1265 Suffolk Ave
NY	Comav	EWSD	Brooklyn	25 Chapel St
NY	Global Crossing	5ER	Brooklyn	55 Meserole St
NY	AT&T	5EH	Buffalo	69 Delaware Ave
NY	AT&T	4E	Buffalo	65 Franklin St
NY	AT&T	5E	Buffalo	325 Delaware Ave
NY	Choice One	5E	Buffalo	350 Main St
NY	Global Crossing	POI	Buffalo	715 Delaware Ave
NY	WorldCom	AXT	Buffalo	325 Delaware - 1st F
NY	WorldCom	5E	Buffalo	325 Delaware Ave
NY	Fairpoint	D12	Chatham	19 Railroad Av
NY	Time Warner	5E	Colonie	10 Airline Dr
NY	GEOTEK	4E	Garden City	741 Zeckendorf Blvd
NY	Global Crossing	5ER	Garden City	741 Zeckendorf Blvd
NY	SBC	5E	Garden City	1100 Stewart Ave
NY	WorldCom	DMH	Garden City	845 Stewart Ave
NY	Cablevision Lightpath	5E	Hicksville	111 New South Rd
NY	AT&T	NT5	Huntington	1444 E Jericho Tpke
NY	Allegiance Telecom	4E	Manhattan	221 E 37th St
NY	American Network	5E	Manhattan	601 W 26th St
NY	AT&T	5E	Manhattan	811 10th Ave
NY	AT&T	5E	Manhattan	811 10th Ave.
NY	AT&T	5E	Manhattan	811 10th Ave.
NY	AT&T	5E	Manhattan	811 10th Ave
NY	AT&T	4E	Manhattan	811 10th Ave
NY	AT&T	4E	Manhattan	811 10th Ave
NY	AT&T	5E	Manhattan	33 Thomas St
NY	AT&T	4E	Manhattan	33 Thomas St
NY	AT&T	4E	Manhattan	33 Thomas St
NY	AT&T	NT5	Manhattan	33 Thomas St
NY	AT&T	5E	Manhattan	67 Broad St
NY	AT&T	5E	Manhattan	1 World Financial (Tower B) Ctr
NY	AT&T	5E	Manhattan	250 Vesey St
NY	Eagle Communications	5E	Manhattan	60 E 56th St
NY	Focal Communications	NT5	Manhattan	325 Hudson St
NY	GEOTEK	4E	Manhattan	33 Thomas St
NY	Gillette Global Network	CSX	Manhattan	39 Broadway
NY	Global Crossing	5ER	Manhattan	160 W Broadway
NY	Global NAPs	NT5	Manhattan	1 Financial Sq
NY	ICG	DS	Manhattan	67 Broad St
NY	Intermedia	NT5	Manhattan	160 W Broadway
NY	International Telcom	DM5	Manhattan	160 W Broadway
NY	Level 3	EN4	Manhattan	111 8th Ave
NY	Metropolitan Telecommunications	DM2	Manhattan	1095 Ave Of The Americas

Voice Switches Serving Verizon Rate Centers				
State	**CLEC**	**Switch Type**	**City**	**Street**
NY	Metropolitan Telecommunications	DCO	Manhattan	67 Broad St
NY	Net2000	DM5	Manhattan	67 Broad St
NY	Net2000	NT5	Manhattan	325 Hudson St
NY	PaeTec	5E	Manhattan	111 8th Ave.
NY	RCN	5E	Manhattan	333 W. Houston St
NY	SBC	DS	Manhattan	601 W 26th St
NY	Teligent	NT5	Manhattan	111 8th Ave
NY	Time Warner	5E	Manhattan	120 E 23rd St
NY	WinStar	5E	Manhattan	140 West St
NY	XO	NT5	Manhattan	111 8th Ave
NY	XO	DS	Manhattan	111 8th Ave
NY	Conversent	5E	Melville	201 Old Country Rd
NY	Nextgen Telephone	CSX	Mount Sinai	28 N Country Rd
NY	Allegiance Telecom	5E	New York	111 8th Ave
NY	Allegiance Telecom	5E	New York	60 Hudson St
NY	AT&T	5EH	New York	32 Old Slip
NY	E.spire	5E	New York	75 Broad Street, 3rd Floor
NY	WinStar	5E	New York	60 Hudson St
NY	WorldCom	AXT	New York	111 8th Ave
NY	WorldCom	DMS	New York	111 8th Ave
NY	WorldCom	NT5	New York	60 Hudson St
NY	WorldCom	NT5	New York	560 Washington St
NY	WorldCom	AXT	New York	120 W 45th St
NY	XO	DMS	New York	75 Broad St
NY	Global Crossing	NT5	New York City	60 Hudson St Rm 204
NY	NECLEC	DMS10	New York City	32 Old Slip
NY	Westelcom Network	DS	Plattsburgh	24 Margaret St
NY	AT&T	5E	Queens	9403 Queens Blvd
NY	Broadview	NT5	Queens	3718 Northern Blvd
NY	RCN	5E	Queens	3316 Woodside Ave
NY	AT&T	4E	Syracuse	201 S State St
NY	AT&T	5EH	Syracuse	109 South Warren St
NY	Broadview	NT5	Syracuse	224 Harrison St
NY	Choice One	5E	Syracuse	110 W Fayette St
NY	CTSI	DMH	Syracuse	201 S State St
NY	Northland Networks	NT5	Syracuse	500 S Salina St
NY	Northland Networks	MFS	Utica	258 Genesee St
NY	Thousand Islands Communications	NT5	Watertown	130 Park Pl
NY	WorldCom	5E	Westbury (Nassau)	48 Swalm St
NY	AT&T	5E	White Plains	400 Hamilton Av
NY	AT&T	4E	White Plains	360 Hamilton Ave
NY	Cablevision Lightpath	5E	White Plains	151 Fulton Ave
NY	GEOTEK	4E	White Plains	111 Main St
NY	WorldCom	5E	White Plains	20 Church St @ Main St
OH	ICG	5E	Akron	520 S Main St
OH	Level 3	EN4	Cincinnati	400 Pike St
OH	Time Warner	5E	Columbus	1125 Chambers Rd
OH	XO	NT5	Columbus	10 W Broad St
OH	Buckeye Telesystem	VCD	Toledo	4818 Angola Rd

Voice Switches Serving Verizon Rate Centers				
State	**CLEC**	**Switch Type**	**City**	**Street**
OR	Great West Services	DS	Beaverton	20700 Nw Trail Walk
OR	Integra	5E	Beaverton	10860 Sw Barnes Rd
OR	Integra	5E	Beaverton	19545 Nw Von Neumann Dr
OR	XO	DMS	Beaverton	9000 Sw Nimbus Ave
OR	Advanced Telcom Group	DS	Portland	810 Se Belmont St
OR	AT&T	4E	Portland	819 Sw Oak St
OR	AT&T	NT5	Portland	819 Sw Oak St
OR	ELI	DMH	Portland	6038 Ne 78th Ct
OR	Eschelon Telecom	D12	Portland	921 Sw Washington, Suite 410
OR	International Telcom	DMS	Portland	6058 Ne 78th Ct
OR	McLeodUSA	DS	Portland	926 Nw 13th Ave
OR	North County Communications	DMH	Portland	921 Sw Washington
OR	Pac-West Telecomm	DX6	Portland	309 Sw 6th Ave
OR	SBC	5E	Portland	5924 Ne 112th Ave
OR	Time Warner	DM5	Portland	520 Sw 6th Ave
OR	WinStar	DS	Portland	6132 Ne 112th Ave
OR	WorldCom	AXT	Portland	851 Sw 6th Ave
OR	WorldCom	NT5	Portland	425 Sw Washington St
OR	North Santiam Communications	D12	Stayton	Stayton
OR	Allegiance Telecom	5.00E+02	Tigard	10575 Sw Cascade Ave
OR	AT&T	5E	Tigard	10340 Sw Nimbus Ave
PA	Choice One	DS	Allentown	7150 Windsor Dr
PA	XO	NT5	Allentown	974 Marcon Blvd
PA	Broadstreet	VCD	Carnegie	500 Noblestown Rd
PA	CTSI	DMH	Clarks Summit	108 N State St
PA	CTSI	D12	Dallas	100 Lake St
PA	Adelphia	5E	Fort Washington	1050 Virginia Dr
PA	AT&T	5E	Fort Washington	1050 Virginia Dr
PA	Penn Telecom	D12	Gibsonia	4008 Gibsonia Rd
PA	Adelphia	5E	Harrisburg	1037 N 7th St
PA	AT&T	4E	Harrisburg	210 Pine St
PA	Choice One	DS	Harrisburg	301 Chestnut St
PA	CTSI	NT5	Harrisburg	31 S 31st St
PA	XO	DMH	Harrisburg	991 Peiffers Ln
PA	Broadview	NT5	Horsham	400 Horsham Rd
PA	WorldCom	DMH	King Of Prussia	630 Clark Ave
PA	CTSI	DMH	Leesport	203 N Centre Av
PA	D&E	D12	Lititz	19 S Cedar St
PA	XO	DS	Lower Paxton	991 Peiffers Ln
PA	Focal Communications	NT5	Norristown	1000 Forge (Bldg C) Ave
PA	RCN	5E	Northampton	5508 Nor Bath Blvd
PA	Adelphia	5E	Philadelphia	3020-3040 Market St
PA	Allegiance Telecom	5E	Philadelphia	401 N Broad St
PA	Arbros Communications	5E	Philadelphia	401 N Broad St
PA	AT&T	DMH	Philadelphia	2130 Arch St
PA	AT&T	DMH	Philadelphia	2130 Arch St
PA	AT&T	5E	Philadelphia	500 S 27th St
PA	AT&T	5E	Philadelphia	500 S 27th St.
PA	Corecomm (ATX)	DMS	Philadelphia	200 S 24th St

Voice Switches Serving Verizon Rate Centers				
State	**CLEC**	**Switch Type**	**City**	**Street**
PA	Corecomm (ATX)	NT5	Philadelphia	200 S 24th St
PA	E.spire	5E	Philadelphia	401 N Broad St
PA	Focal Communications	NT5	Philadelphia	701 Market St
PA	Intermedia	NT5	Philadelphia	401 N Broad St
PA	Level 3	EN4	Philadelphia	401 N Broad St
PA	Net2000	NT5	Philadelphia	401 N Broad St
PA	North Americom Corp.	5E	Philadelphia	401 N Broad St
PA	PaeTec	VCD	Philadelphia	401 N Broad St
PA	SBC	500	Philadelphia	401 N Broad St
PA	Teligent	NT5	Philadelphia	401 N Broad St
PA	Teligent	NT5	Philadelphia	401 N Broad St
PA	Urban Media	NT5	Philadelphia	1309 Noble St
PA	US LEC	5E	Philadelphia	401 N Broad St
PA	WinStar	VCD	Philadelphia	1101 Market St
PA	WorldCom	DE5	Philadelphia	401 N. Broad St
PA	WorldCom	DE5	Philadelphia	401 N. Broad St
PA	XO	NT5	Philadelphia	2400 Market St
PA	AT&T	NT5	Pittsburg	635 Grant St.
PA	Adelphia	5E	Pittsburgh	200 Technology Dr
PA	Allegiance Telecom	5.00E+02	Pittsburgh	Allegheny Ctr Mall
PA	AT&T	4E	Pittsburgh	635 Grant St
PA	AT&T	5E	Pittsburgh	2500 Allegheny Ctr Mall
PA	Choice One	5E	Pittsburgh	650 Smithfield St
PA	Corecomm (ATX)	NT5	Pittsburgh	812 5th Ave
PA	Intermedia	NT5	Pittsburgh	1400 Penn Ave
PA	US LEC	5E	Pittsburgh	Allegheny Ctr Mall
PA	WinStar	DS	Pittsburgh	707 Grant St
PA	WorldCom	DE4	Pittsburgh	2990 Sassafras Way
PA	WorldCom	DMH	Pittsburgh	2990 Sassafras Way
PA	Adelphia	5E	Pittston	1180 Sathers Dr
PA	CTSI	DMH	Plains	300a Laird St
PA	AT&T	POI	Pottsville	301-305 West Market St
PA	RCN	5E	Providence Twnsp	1000 Adams Ave
PA	Adelphia	5E	State College	101 Innovations Blvd
PA	Cavalier Telephone	5E	Warminster	965 Thomas Dr
PA	AT&T	5E	Wayne	60 West Ave
PA	Choice One	DS	Wilkes-Barre	1090 Hanover St
PA	Adelphia	5E	York	140 W Market St
RI	NECLEC	DMS5	Newport	17 Goodwin St
RI	Choice One	5E	Providence	121 S Main St
RI	Conversent	5E	Providence	935 Westminster St
RI	Global NAPs	DMS	Providence	275 Promenade St
RI	International Telcom	DM5	Providence	304 Carpenter St
RI	Level 3	EN4	Providence	235-275 Promenade St
RI	WorldCom	5E	Providence	8 Parsonage St
RI	AT&T	NT5	Providence Ri	275 Promenade St.
RI	Cox	DMS	West Warwick	11 James P Murphy Ind Hwy
SC	HTC Communications	EWSD	Collins Creek	Hwy 707
SC	NewSouth Communications	5E	Greenville	5 Duncan St

Voice Switches Serving Verizon Rate Centers				
State	**CLEC**	**Switch Type**	**City**	**Street**
SC	PRT Communications	EWSD	Laurens	102 Spring St
SC	NewSouth Communications	POI	Myrtle Beach	914 East Chester St @ 9th Ave
TX	SBC	5E	Allen	W First St
TX	AT&T	NT5	Austin	120 W 9th
TX	Central Texas Communications	DCO	Big Valley	Big Valley
TX	Grande Communications Networks	D12	Bryan	219 N. Main Rm 209
TX	Koyote Telephone	CSX	Commerce	1206 Maloney St
TX	Allegiance Telecom	5E	Dallas	1950 N Stemmons Fwy
TX	AT&T	DMH	Dallas	13601 Preston- Annex Tower Rd
TX	AT&T	5E	Dallas	4100 Bryan St
TX	CapRock	DM5	Dallas	600 N Pearl South Tower
TX	Coserv	VCD	Dallas	1950 N Stemmons Fwy
TX	Focal Communications	DMH	Dallas	1950 N Stemmons Fwy
TX	Global Crossing	NT5	Dallas	2323 Bryan Street,
TX	ICG	5E	Dallas	717 N Harwood St
TX	Ionex Communications	5E	Dallas	1201 Main St
TX	Level 3	EN4	Dallas	3180 Irving Blvd
TX	Optel	5E	Dallas	3228 Halifax St
TX	SBC	5ER	Dallas	17451 Dallas Pky
TX	Teligent	NT5	Dallas	1950 N Stemmons Fwy
TX	Time Warner	5E	Dallas	1100 Regal Row
TX	Urban Media	NT5	Dallas	2020 Live Oak St
TX	WorldCom	NT5	Dallas	1950 Stemmons
TX	XO	DMS	Dallas	1300 Mockingbird
TX	Grande Communications Networks	D12	Denton	Twu Admin Dr
TX	Nortex Telecom	DCO	Denton	3400 Sundown Blvd
TX	SBC	5E	Fort Worth	1116 Houston St
TX	Coserv	D12	Frisco	3966 Parkwood Blvd
TX	AT&T	DMH	Houston	1301 Fannin, Suite 1290
TX	Focal Communications	NT5	Houston	5959 Corporate Dr
TX	Grande Communications Networks	D12	Houston	1200 Clay St
TX	ICG	5E	Houston	2100 W Loop S
TX	Level 3	EN4	Houston	12001 Interstate 45 N
TX	Optel	5E	Houston	10300 Westoffice Dr
TX	Teligent	NT5	Houston	1301 Fannin St
TX	Time Warner	5E	Houston	8495 Tidwell Rd
TX	Time Warner	EWSD	Houston	2900 Weslayan St
TX	WorldCom	NT5	Houston	1301 Fannin St
TX	SBC	5E	Irving	625 E Royal Ln
TX	WorldCom	NT5	Irving	2477 Gateway Dr
TX	Fort Bend Long Distance	5E	Katy	1400 Ave A
TX	Millennium Telcom	DMT	Keller	4700 Keller Hicks Rd
TX	ATS	5E	Kyle	168 Kirkham Cir
TX	AT&T	DMS	Plano	6501 Windcrest Dr
TX	WorldCom	NT5	Richardson	400 International Pkwy, 2nd Fl East
TX	Central Texas Communications	DCO	San Angelo	100 Strawn Rd
TX	Grande Communications Networks	D12	San Angelo	36 E. Twohig 15th Floor
TX	WorldCom	NT5	San Antionio	222 Rotary
TX	Adelphia	5E	San Antonio	701 Broadway St

Voice Switches Serving Verizon Rate Centers				
State	**CLEC**	**Switch Type**	**City**	**Street**
TX	Grande Communications Networks	D12	Sherman	200 N. Travis
VA	Comcast	D12	Alexandria	3900 Wheeler Ave
VA	AT&T	5E	Arlington	900 S Walter Reed Dr
VA	AT&T	4E	Arlington	900 S Walter Reed Dr
VA	AT&T	5E	Arlington	900 S Walter Reed Dr
VA	Broadstreet	VCD	Chantilly	3863 Centerview Dr
VA	ALLTEL	DMH	Chesapeake	811 Industrial Ave
VA	Broadstreet	VCD	Chesapeake	510 Independence Parkway
VA	Level 3	DS	Chesapeake	811 Industrial Ave
VA	SBC	5E	Chesapeake	814 Greenbrier Cir
VA	Intermedia	NT5	Fairfax	2720-D Prosperity Ave
VA	AT&T	NT5	Fredericksburg	901 Prince Edward St
VA	Broadstreet	VCD	Glenallen	4206 Park Place Ct
VA	Shen Tel	POI	Harrisonburg	151 S Mason St
VA	Cavalier Telephone	5E	Herndon	360 Herndon Pky
VA	Urban Media	NT5	Herndon	470 Springpark Pl
VA	Openband	5E	Leesburg	19106 Xerox Dr
VA	Cox	DS	Newport News	179 Louise Dr
VA	Adelphia	5E	Norfolk	2600 Eltham Ave
VA	AT&T	4E	Norfolk	120-36 W Bute St
VA	Cavalier Telephone	5E	Norfolk	1319 Ingleside Rd
VA	Cox	DS	Norfolk	4585 Village Ave
VA	Picus	NT5	Norfolk	370 World Trade Ctr
VA	KMC Telecom	5E	Portsmouth	969 Broad St
VA	Global NAPs	NT5	Reston	12347 Sunrise Valley Dr
VA	Level 3	EN4	Reston	12369 Sunrise Valley Dr
VA	WorldCom	NT5	Reston	12379 Sunrise Valley Dr
VA	WorldCom	DMH	Reston	12379 Sunrise Valley Dr
VA	Adelphia	5E	Richmond	3909 A Carolina Ave
VA	ALLTEL	DMH	Richmond	2501 Goodes Bridge Rd
VA	AT&T	5E	Richmond	703 E Grace St
VA	AT&T	4E	Richmond	2510 Turner Rd
VA	AT&T	5E	Richmond	5401 Staples Mills Rd
VA	Cavalier Telephone	5E	Richmond	2134 W Laburnum Ave
VA	Net2000	DM5	Richmond	701 E Cary St
VA	US LEC	5E	Richmond	7401 Beaufont Springs Dr
VA	Level 3	DS	Richmond	8851 Park Central Dr
VA	AT&T	POI	Roanoke	225 Franklin Rd Sw
VA	Broadstreet	VCD	Roanoke	5305 Valleypark Dr
VA	KMC Telecom	5E	Roanoke	2151 Hollins Rd Ne
VA	NTELOS Network	5E	Staunton	115 Fillmore St
VA	PaeTec	5E	Sterling	22685 Holiday Park Dr
VA	R&B Network	5E	Troutville	75 Sunset Ave
VA	US LEC	5E	Tysons Corner	7901 Jones Branch Dr
VA	ICG	5E	Vienna	8504 Tyco Rd
VA	US LEC	5E	Virginia Beach	477 Viking Dr
VA	NTELOS Network	5EH	Winchester	120 N Braddock St
VT	Lightship Telecom	DMT	Burlington	7 Burlington Sq
VT	Adelphia	5E	South Burlington	102 Kimball Ave

Voice Switches Serving Verizon Rate Centers				
State	**CLEC**	**Switch Type**	**City**	**Street**
VT	National Mobile Comm.	EWSD	Winooski	276 E Allen St
WA	Adelphia	5E	Bellevue	13410 Ne 16th St
WA	Advanced Telcom Group	DS	Everett	2939 Colby Ave
WA	Integra	5E	Kent	20435 72nd Ave S
WA	WorldCom	AXT	Kirkland	11311 Ne 120th St
WA	WorldCom	5E	Kirkland	11311 Ne 120th St
WA	AT&T	5E	Redmond	11241 Willows Rd
WA	Allegiance Telecom	5E	Seattle	1100 2nd Ave, 1st Floor
WA	AT&T	5E	Seattle	15008 8th Ave Sw
WA	AT&T	5E	Seattle	1122 3rd Ave
WA	AT&T	5E	Seattle	1215 4th Ave
WA	ELI	D12	Seattle	1218 3rd Ave Rm.410
WA	Eschelon Telecom	NT5	Seattle	1200 3rd Ave
WA	Focal Communications	NT5	Seattle	1511 6th Ave
WA	Global Crossing	NT5	Seattle	2001 6th Ave, Suite 1605
WA	International Telcom	DMS	Seattle	417 2nd Ave W
WA	Level 3	EN4	Seattle	1000 Denny Way
WA	SBC	DS	Seattle	1505 5th Ave 2nd Floor
WA	Teligent	NT5	Seattle	1551 Eastlake Ave
WA	WinStar	VCD	Seattle	1000 2nd Ave
WA	WinStar	VCD	Seattle	1000 2nd Ave
WA	WorldCom	NT5	Seattle	2001 6th
WA	XO	DMS	Seattle	1000 Denny Way
WA	International Telcom	DM5	Spokane	9515 E 1st Ave
WA	AT&T	4E	Tacoma	757 S Fawcett Ave
WA	ELI	D12	Tukwila	13705 Gateway Dr
WA	McLeodUSA	DS	Tukwila	3311 S 120th Pl
WA	Pac-West Telecomm	DX6	Tukwila	12201 Pacific Hwy S
WA	LocalTel	VCD	Wenatchee	215 Yakima St
WI	AT&T	5E	West Allis	2152 S 114th St
WV	AT&T	4E	Charleston	816 Lee St E
WV	Fibernet	5E	Charleston	211 Broad St
WV	North County Communications	DMH	Charleston	405 Capitol St
WV	NTELOS Network	5E	Charleston	500 Summers St
WV	Shen Tel	POI	Martinsburg	152 Factory St
WV	CTSI	DMH	Nitro	2006 20th St
WV	Stratus Wave	EWSD	Wheeling	1025 Main St

APPENDIX B. PACKET SWITCHES

Data Switches in Verizon East's Region				
State	**CLEC**	**Number of Switches**	**Switch Type**	**City**
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	Covad	1	n/a	Washington, DC
DC	e.spire Communications	1	Alcatel Multiservice	Washington, DC
DC	Electric Lightwave	2	Ascend	Washington, DC
DC	Focal Communications	1	n/a	Washington, DC
DC	Global Crossing	1	Lucent Ascend	Washington, DC
DC	Intermedia Communications	5*	Ascend 9000/Ascend CBX500	Washington, DC
DC	Net2000 Communications	1	Nortel 7480	Washington, DC
DC	Network Access Solutions	1	Frame Relay/ATM	Washington, DC
DC	Rhythms Netconnections	1*	n/a	Washington, DC
DC	Teligent	22	12 Cisco/2 Foundry/8 Samsung	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	2nd Century	planned*	n/a	Washington, DC
DC	Arbros Communications	planned*	n/a	Washington, DC
DC	Backbone Communications	planned*	n/a	Washington, DC
DC	North American Telecommunications	planned	Siemens TransXpress/CBX500	Washington, DC
DC	Telergy	planned	ATM	Washington, DC
DE	Conectiv Communications	1	Cisco Stratecom	Dover
DE	Conectiv Communications	2	Cisco Stratecom	Newark
DE	Conectiv Communications	1	Cisco Stratecom	Wilmington
DE	Network Access Solutions	planned	Frame Relay/ATM	Wilmington
MA	2nd Century	1*	n/a	Boston
MA	Adelphia Business Solutions	1	n/a	Boston
MA	Allegiance Telecom	1	Cisco BPX 8650	Boston
MA	AT&T	2	ATM/Frame Relay	Boston
MA	CTC Communications	1	Cisco BPX 8650	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	Accell AN3220	Boston
MA	Net2000 Communications	1	Nortel 7480	Boston
MA	Network Access Solutions	1	Frame Relay/ATM	Boston
MA	Rhythms Netconnections	1*	n/a	Boston
MA	Telergy	1	ATM	Boston
MA	Teligent	15	7 Cisco/ 8 Samsung	Boston
MA	WinStar Communications	1	Newbridge ATM	Boston
MA	CTC Communications	1	Cisco 8600/8800	Braintree
MA	CTC Communications	1	Cisco 8600/8800	Danvers
MA	Vitts Corp. d/b/a Vitts Networks	1	n/a	Framingham
MA	Vitts Corp. d/b/a Vitts Networks	1	n/a	Lawrence
MA	CTC Communications	1	Cisco 8600/8800	Lexington
MA	CTC Communications	1	Cisco 8600/8800	Manchester
MA	CTC Communications	1	Cisco 8600/8800	Marlboro
MA	CTC Communications	1	Cisco 8600/8800	North Attleboro

Data Switches in Verizon East's Region				
State	**CLEC**	**Number of Switches**	**Switch Type**	**City**
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	Choice One Communications	1	Lucent 5ESS	Worcester
MA	Lightship Telecom	1	Lucent CBX500	Worcester
MA	Arbros Communications	planned*	n/a	Boston
MA	Backbone Communications	planned*	n/a	Boston
MA	Broadview Networks	planned	Cisco ATM	Boston
MA	Focal Communications	planned	n/a	Boston
MD	2nd Century	1	n/a	Baltimore
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	Network Access Solutions	1	Frame Relay/ATM	Baltimore
MD	Rhythms Netconnections	1	n/a	Baltimore
MD	US LEC	1	Lucent CBX500	Baltimore
MD	Winstar Communications	1	Newbridge ATM	Baltimore
MD	Arbros Communications	planned*	n/a	Baltimore
MD	Arbros Communications	planned*	n/a	Landover
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
NH	CTC Communications	1	Cisco 8600/8800	Bedford
NH	Vitts Corp. d/b/a Vitts Networks	1	n/a	Concord
NH	Vitts Corp. d/b/a Vitts Networks	1	n/a	Dover
NH	Vitts Corp. d/b/a Vitts Networks	1	n/a	Exeter
NH	Vitts Corp. d/b/a Vitts Networks	1	n/a	Keene
NH	Choice One Communications	1	Lucent/Cisco	Manchester
NH	FairPoint Communications	1	n/a	Manchester
NH	Lightship Telecom	1	Lucent CBX500	Manchester
NH	Vitts Corp. d/b/a Vitts Networks	1	n/a	Manchester
NH	Vitts Corp. d/b/a Vitts Networks	1	n/a	Nashua
NH	Vitts Corp. d/b/a Vitts Networks	1	n/a	Portsmouth
NH	Vitts Corp. d/b/a Vitts Networks	1	n/a	Rochester
NH	Vitts Corp. d/b/a Vitts Networks	1	n/a	Salem
NH	Vitts Corp. d/b/a Vitts Networks	1	n/a	Suncook
NJ	Intermedia Communications	1	Ascend 9000	Jersey City
NJ	AT&T	1	ATM	New Brunswick
NJ	Focal Communications	1	n/a	New Brunswick
NJ	WinStar Communications	1	Newbridge ATM	New Brunswick
NJ	Allegiance Telecom	1	Cisco BPX 8650	Newark
NJ	AT&T	2	ATM/Frame Relay	Newark
NJ	Intermedia Communications	1	Ascend 9000	Newark

Data Switches in Verizon East's Region				
State	**CLEC**	**Number of Switches**	**Switch Type**	**City**
NJ	Lightyear Communications	1	Accel AN3220	Newark
NJ	WinStar Communications	1	Newbridge ATM	Newark
NJ	Adelphia Business Solutions	1	Ascend ATM	Parsippany
NJ	Arbros Communications	planned*	n/a	Newark
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	Lucent	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	Global Crossing	1	Lucent Ascend	Buffalo
NY	Intermedia Communications	4*	Ascend 9000/Ascend CBX500	Buffalo
NY	Rhythms Netconnections	1*	n/a	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	Lucent	Hicksville
NY	North American Telecommunications	1	Siemens TransXpress/CBX500	Long Island
NY	CTC Communications	1	Cisco 8600/8800	Melville
NY	CTC Communications	1	Cisco 8600/8800	Nanuet
NY	2nd Century	1*	n/a	New York
NY	Allegiance Telecom	2	Cisco BPX 8650	New York
NY	AT&T	2	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	Electric Lightwave	2	Ascend	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 Access Solutions	1	Frame Relay/ATM	New York
NY	Network Plus Corp	1*	n/a	New York
NY	Reach Communications	1	n/a	New York
NY	Rhythms Netconnections	1*	n/a	New York
NY	Sphera Optical	1*	n/a	New York
NY	Telergy	1	ATM	New York
NY	Teligent	19	11 Cisco/ 8 Samsung	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	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

Data Switches in Verizon East's Region				
State	**CLEC**	**Number of Switches**	**Switch Type**	**City**
NY	Telergy	1	n/a	Syracuse
NY	CTC Communications	1	Cisco 8600/8800	Yorktown Heights
NY	Net2000 Communications	planned	n/a	Long Island
NY	Rhythms Netconnections	planned*	n/a	Long Island
NY	Arbros Communications	planned*	n/a	New York
NY	Backbone Communications	planned*	n/a	New York
NY	BTI Telecom	planned	Lucent ATM	New York
NY	Broadview Networks	planned	Cisco ATM	New York
NY	Broadview Networks	planned	Cisco ATM	Syracuse
PA	Choice One Communications	1	Lucent/Cisco ATM	Allentown
PA	Penn Telecom d/b/a Penntele.com	1	n/a	Gibsonia
PA	Choice One Communications	1	Lucent/Cisco ATM	Harrisburg
PA	Intermedia Communications	1	Ascend 9000	Harrisburg
PA	2nd Century	1*	n/a	Philadelphia
PA	Allegiance Telecom	1	Cisco BPX 8650	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	Electric Lightwave	1	Ascend	Philadelphia
PA	Focal Communications	1	Juniper /Foundry	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	Network Access Solutions	1	Frame Relay/ATM	Philadelphia
PA	Rhythms Netconnections	1*	n/a	Philadelphia
PA	Teligent	17	10 Cisco/ 7 Samsung	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	2nd Century	1*	n/a	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	Net2000 Communications	1	Frame Relay/ATM	Pittsburgh
PA	Teligent	1	ATM	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
PA	Arbros Communications	planned*	n/a	Philadelphia
PA	Backbone Communications	planned*	n/a	Philadelphia
PA	North American Telecommunications	planned	Siemens TransXpress/CBX500	Philadelphia
PA	Arbros Communications	planned*	n/a	Pittsburgh
PA	Network Access Solutions	planned	Frame Relay/ATM	Pittsburgh
PA	Rhythms Netconnections	planned*	n/a	Pittsburgh
PA	Telergy	planned	ATM	Pittsburgh
RI	AT&T	1	ATM	Providence

Data Switches in Verizon East's Region				
State	**CLEC**	**Number of Switches**	**Switch Type**	**City**
RI	Choice One Communications	1	Lucent/Cisco	Providence
RI	Intermedia Communications	1	Ascend 9000	Providence
RI	Rhythms Netconnections	planned*	n/a	Providence
VA	Intermedia Communications	1*	n/a	Fairfax
VA	Teligent	1	ATM: Cisco	Fairfax
VA	Picus Communications	1*	n/a	Hampton Roads
VA	Teligent	9	ATM: Cisco	Herndon
VA	Net2000 Communications	1	Nortel 7480	Norfolk
VA	Rhythms Netconnections	1*	n/a	Norfolk
VA	US LEC	1	Lucent CBX500	Norfolk
VA	WinStar Communications	1	Newbridge ATM	Norfolk
VA	Teligent	1	Cisco	Reston
VA	e.spire Communications	1	Alcatel Multiservice	Richmond
VA	Intermedia Communications	2*	Ascend 9000	Richmond
VA	Net2000 Communications	1	Nortel 7480	Richmond
VA	Network Access Solutions	1	Frame Relay/ATM	Richmond
VA	NTELOS	1	n/a	Roanoke
VA	Intermedia Communications	1*	n/a	Vienna
VA	Teligent	5	5 Cisco	Vienna
VA	NTELOS	1	n/a	Waynesboro
VA	Arbros Communications	planned*	n/a	Alexandria
VA	Net2000 Communications	planned	n/a	Alexandria
VA	BTI Telecom	planned	Lucent Ascend	Norfolk
VA	Network Access Solutions	planned	Frame Relay/ATM	Norfolk
VA	BTI Telecom	planned	Lucent Acend	Richmond
VA	Choice One Communications	planned	Cisco	Richmond
VA	US LEC	planned	Lucent CBX500	Richmond
VA	Rhythms Netconnections	planned*	n/a	Virginia Beach
VT	CTC Communications	1	Cisco 8600/8800	Burlington
VT	Lightship Telecom	1	Lucent CBX500	Burlington
WV	NTELOS	1	Lucent 5ESS Digital	Charleston

*New Paradigm Resources Group provides switch type and location for some but not all of these switches.

Source: New Paradigm Resources Group, *CLEC Report 2001*, Chs. 9 & 13 (14th ed. 2001).

APPENDIX C. COLLOCATION HOTELS

Competitive Collocation Providers in Verizon MSAs	
MSA	**Companies with Operational and Planned(*) Collocation Facilities**
New York, NY	AccessColo, COLO.com, E-COLO.com, ExtraNet, Global NAPs, MetroNexus, Switch & Data (3), Telehouse America (2), TelX, The Raco Group
Philadelphia, PA-NJ	AccessColo*, E-COLO.com, Switch & Data, COLO.com*
Washington, DC-MD-VA-WV	AccessColo*, COLO.com, ColoSafe (1+1*), ColoSolutions*, E-COLO.com (4), ExtraNet*, Gateway Colo*, Global NAPs, Switch & Data
Boston, MA-NH	AccessColo*, COLO.com , E-COLO.com, Gateway Colo*, Layerone*, Switch & Data
Nassau-Suffolk, NY	AccessColo*
Baltimore, MD	AccessColo*, ColoSafe*, E-COLO.com, SkyNetWeb
Pittsburgh, PA	AccessColo*, ColoSolutions, E-COLO.com, Switch & Data, COLO.com
Newark, NJ	E-COLO.com, Gateway Colo
Norfolk-Virginia Beach-Newport News, VA-NC	E-COLO.com, ColoSafe*, ColoSolutions*
Buffalo-Niagara Falls, NY	E-COLO.com, The Raco Group
Richmond-Petersburg, VA	ColoSafe*, E-COLO.com
Portland, ME	ColoSolutions, E-COLO.com
Manchester, NH	ColoSolutions, E-COLO.com
Charlottesville, VA	ColoSafe*
Sources: See Appendix E.	

APPENDIX D. CLEC FIBER

CLEC Fiber Networks in Verizon East MSAs	
MSA	**Fiber Network – 2000**
1. New York, NY	Adelphia Business Solutions, Allegiance Telecom, AT&T, BTI Telecom, Cablevision Lightpath, Electric Lightwave, Lightyear Communications, e.spire, Focal Communications, Level 3, FiberNet, Metromedia, NAS, NECLEC, North American Telecommunications, NEON Optica, RCN, Telergy, Time Warner Telecom, WorldCom, XO **CLECs: 21**
2. Boston, MA	Adelphia Business Solutions, Allegiance Telecom, AT&T, Intermedia, Level 3, Lightyear Communications, Metromedia, NAS, NECLEC, NEON Optica, RCN, Telergy, WorldCom, XO **CLECs: 14**
3. Washington, DC-MD-VA-WV	Adelphia Business Solutions, Allegiance Telecom, AT&T, BTI Telecom, Cavalier Telephone, Electric Lightwave, e.spire, Focal Communications, Intermedia, Comcast, KMC Telecom, Level 3, Metromedia, NAS, RCN, Telergy, U.S. Online, WorldCom, XO **CLECs: 19**
4. Philadelphia, PA-NJ	Adelphia Business Solutions, Allegiance Telecom, AT&T, BTI Telecom, CEI Networks, Conectiv, Electric Lightwave, e.spire, Focal Communications, Intermedia, Level 3, Metromedia, NAS, RCN, Telergy, WorldCom, XO **CLECs: 17**
5. Nassau-Suffolk, NY	AT&T, Cablevision Lightpath, Intermedia, North American Telecommunications, WorldCom **CLECs: 5**
6. Baltimore, MD	Adelphia Business Solutions, AT&T, Cavalier Telephone, Conectiv, e.spire, Intermedia, Lightyear Communications, NAS, Telergy, WorldCom, XO **CLECs: 11**
7. Pittsburgh, PA	Adelphia Business Solutions, AT&T, Intermedia, Penntele.com, Telergy, WorldCom **CLECs: 6**
8. Newark, NJ	Adelphia Business Solution, Allegiance Telecom, AT&T, Focal Communications, Intermedia, Lightyear Communications, WorldCom, XO **CLECs: 8**
9. Norfolk-Virginia Beach-Newport News, VA-NC	Adelphia Business Solutions, BTI Telecom, Cavalier Telephone, Cox, Intermedia, KMC Telecom **CLECs: 6**
10. Bergen-Passaic, NJ	AT&T, WorldCom **CLECs: 2**
11. Middlesex-Somerset-Hunterdon, NJ	Adelphia Business Solutions, AT&T, WorldCom **CLECs: 3**
12. Monmouth-Ocean, NJ	AT&T **CLECs: 1**

CLEC Fiber Networks in Verizon East MSAs	
MSA	**Fiber Network – 2000**
13. Buffalo-Niagara Falls, NY	Adelphia Business Solutions, Intermedia, Telergy, WorldCom **CLECs: 4**
14. Richmond-Petersburg, VA	Adelphia Business Solutions, BTI Telecom, Cavalier Telephone, Intermedia, Network Access Solutions, NTELOS, WorldCom **CLECs: 7**
15. Providence-Warwick-Pawtucket RI-MA	AT&T, Intermedia, NECLEC, NEON Optica, Telergy, WorldCom **CLECs: 6**
16. Albany-Schenectady-Troy, NY	Adelphia Business Solutions, Choice One, Intermedia, Telergy, Time Warner Telecom, WorldCom **CLECs: 6**
17. Syracuse, NY	Adelphia Business Solutions, CTSI, Intermedia, Telergy **CLECs: 4**
18. Allentown-Bethlehem-Easton, PA	Adelphia Business Solutions, Intermedia, XO **CLECs: 3**
19. Harrisburg-Lebanon-Carlisle, PA	Adelphia Business Solutions, Conectiv, CTSI, Intermedia, XO **CLECs: 5**
20. Wilmington-Newark, DE-MD	Adelphia Business Solutions, AT&T, Conectiv, ITC-DeltaCom, WorldCom **CLECs: 5**
21. Springfield, MA	NEON Optica,, WorldCom **CLECs: 2**
22. Scranton-Wilkes-Barre-Hazleton, PA	Adelphia Business Solutions, CTSI, XO **CLECs: 3**
23. Jersey City, NJ	AT&T, Focal Communications, Intermedia, RCN, Time Warner Telecom, WorldCom **CLECs: 6**
24. Lancaster, PA	Adelphia Business Solutions, Conectiv, CTSI, XO **CLECs: 4**
25. Newburgh, NY-PA	
26. York, PA	Adelphia Business Solutions, CTSI **CLECs: 2**
27. Reading, PA	Adelphia Business Solutions, CEI Networks, CTSI, XO **CLECs: 4**
28. Atlantic-Cape May, NJ	Adelphia Business Solutions, AT&T, Conectiv, WorldCom **CLECs: 4**
29. Trenton, NJ	AT&T, Conectiv, Intermedia, WorldCom **CLECs: 4**
Sources: New Paradigm Resources Group, Inc., *CLEC Report 2001* (14th ed. 2001); New Paradigm Resources Group, Inc., *CLEC Report 2001* (13th ed. 2001); Verizon internal data; New Paradigm Resources Group, Inc., *CLEC Report 2000* (11th & 12th eds. 2000).	

APPENDIX E. WHOLESALE LOCAL FIBER SUPPLIERS

Wholesale Local Fiber Suppliers in Verizon East's Region	
Company	**Cities with Operational and Planned(*) Networks**
Metromedia Fiber Networks	Boston, New York City, Philadelphia, Washington, D.C.
American Fiber Systems	Wilmington, Baltimore, Springfield, Worcester, Atlantic City, Newark, Trenton, Albany, Buffalo, Syracuse, Harrisburg, Pittsburgh, Providence, Richmond, Norfolk
Fiber Technologies	Albany, Syracuse, Buffalo*, Pittsburgh*, Springfield*, Providence*, Worcester*, Allentown*, Richmond*, Erie*, Portland, ME *, northern NJ*, Lancaster*, Baltimore*, Charleston, WV*, Roanoke*, Norfolk*, Harrisburg*, Scranton*, Manchester*
Yipes	Boston, Philadelphia, Pittsburgh, Washington, D.C., Worcester
Telseon	Boston, Newark, New York City, Philadelphia, McLean, Reston, Vienna
Looking Glass	Company has approvals to operate as a public utility and to offer facilities-based telecommunications services in states including Maryland and Virginia
Telergy	Buffalo, Syracuse, Albany, New York City
Northeast Optic Network	Boston, New York, Philadelphia, Washington, D.C.
Sources: See Appendix F.	

APPENDIX F. ADDITIONAL SOURCES

Figure 1. CLEC Switches in Verizon East's Region
Voice Switches. **1999.** Bellcore, TR-EQP-000315, *Local Exchange Routing* Guide (Mar. 1, 1999). **2001.** Telcordia, *Local Exchange Routing Guide* (Aug. 2001). ***Data Switches.*** **1998.** New Paradigm Resources Group, Inc., *CLEC Report 2000*, Ch. 6 at Table 8 (12th ed. 2000); New Paradigm Resources Group, Inc., *CLEC Report 1999*, Ch. 8 (10th ed. 1999). **2000.** New Paradigm Resources Group, Inc., *CLEC Report 2001*, Ch. 7 at Table 8, Ch. 9, Ch. 13 (14th ed. 2001).

Table 1. CLEC Switches in Verizon's Region
Voice Switches. Telcordia, *Local Exchange Routing Guide* (Aug. 2001). ***Data Switches.*** New Paradigm Resources Group, Inc., *CLEC Report 2001*, Chs. 9 & 13 (14th ed. 2001).

Map 1. CLEC Switches in Verizon's Region
Telcordia, *Local Exchange Routing Guide* (Aug. 2001); New Paradigm Resources Group, Inc., *CLEC Report 2001*, Chs. 9 & 13 (14th ed. 2001).

Figure 2. CLEC Switch Ownership in Verizon's Region
Voice Switches. Telcordia, *Local Exchange Routing Guide* (Aug. 2001). ***Data Switches.*** New Paradigm Resources Group, Inc., *CLEC Report 2001*, Chs. 9 & 13 (14th ed. 2001).

Figure 3. CLEC Ported Numbers in Verizon East's Region
Internal Verizon data.

Figure 4. NXX Codes Assigned to Verizon Rate Centers
Internal Verizon data.

Map 2. Rate Exchange Areas Served by CLEC Switches
Telcordia, *Local Exchange Routing Guide* (Aug. 2001); New Paradigm Resources Group, Inc., *CLEC Report 2001*, Chs. 9 & 13 (14th ed. 2001).

Table 2. CLECs Providing Facilities-Based Residential Service
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Table 3. Rate Exchange Areas Where CLECs Have Obtained Ported Numbers or NXX Codes
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Figure 5. Collocation in Verizon East's Region
Internal Verizon data.

Figure 6. Growth of CLEC Packet Switches
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Table 4. CLEC Data Service Offerings

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Table 6. Voice Capabilities of Packet Switches Deployed by CLECs in Verizon's Region

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Table 9. Features of Packet Switches/Softswitches vs. Traditional Circuit Switches

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Table 10. Major Softswitch Manufacturers

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Appendix E. Wholesale Local Fiber Suppliers

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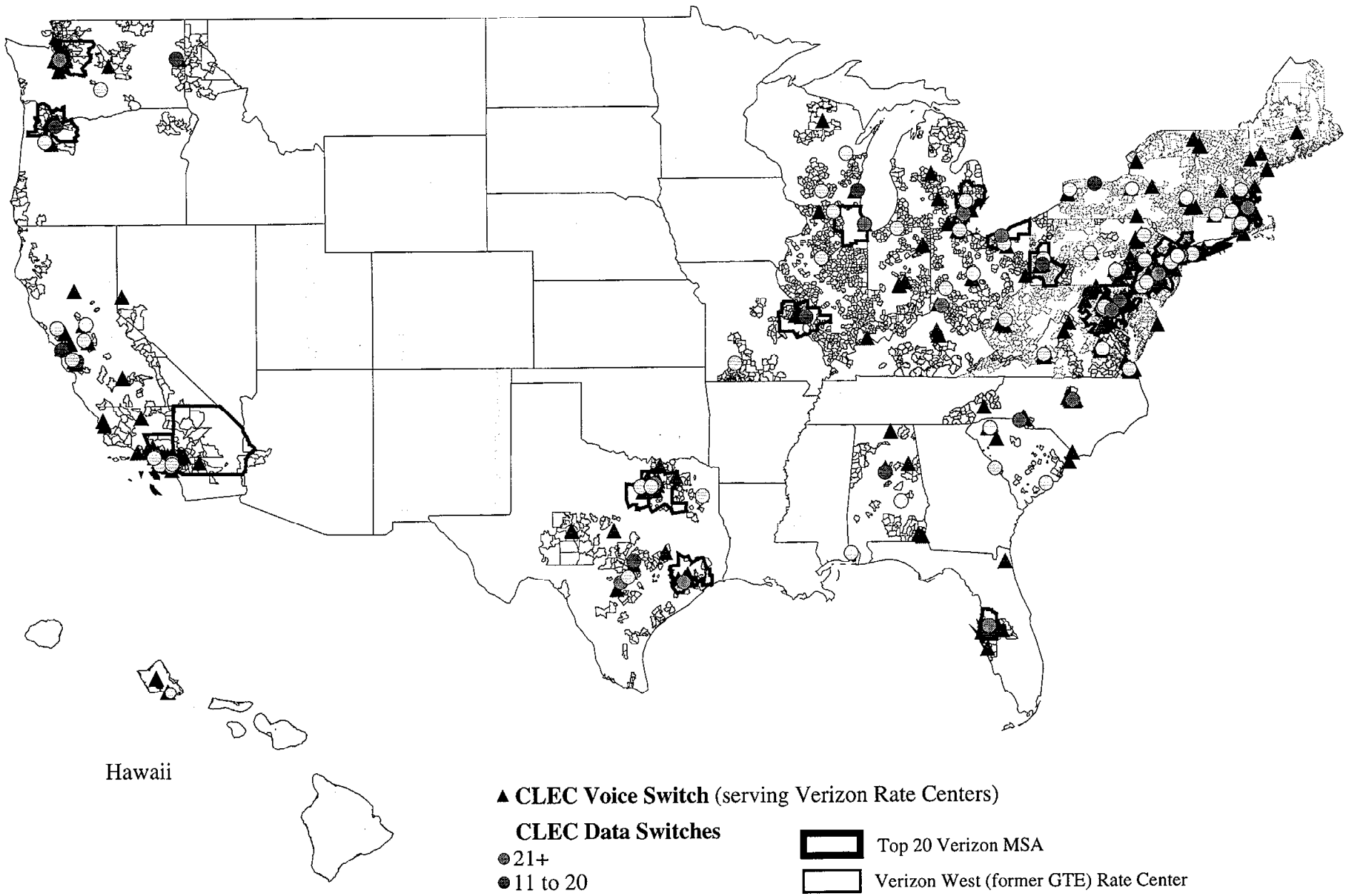
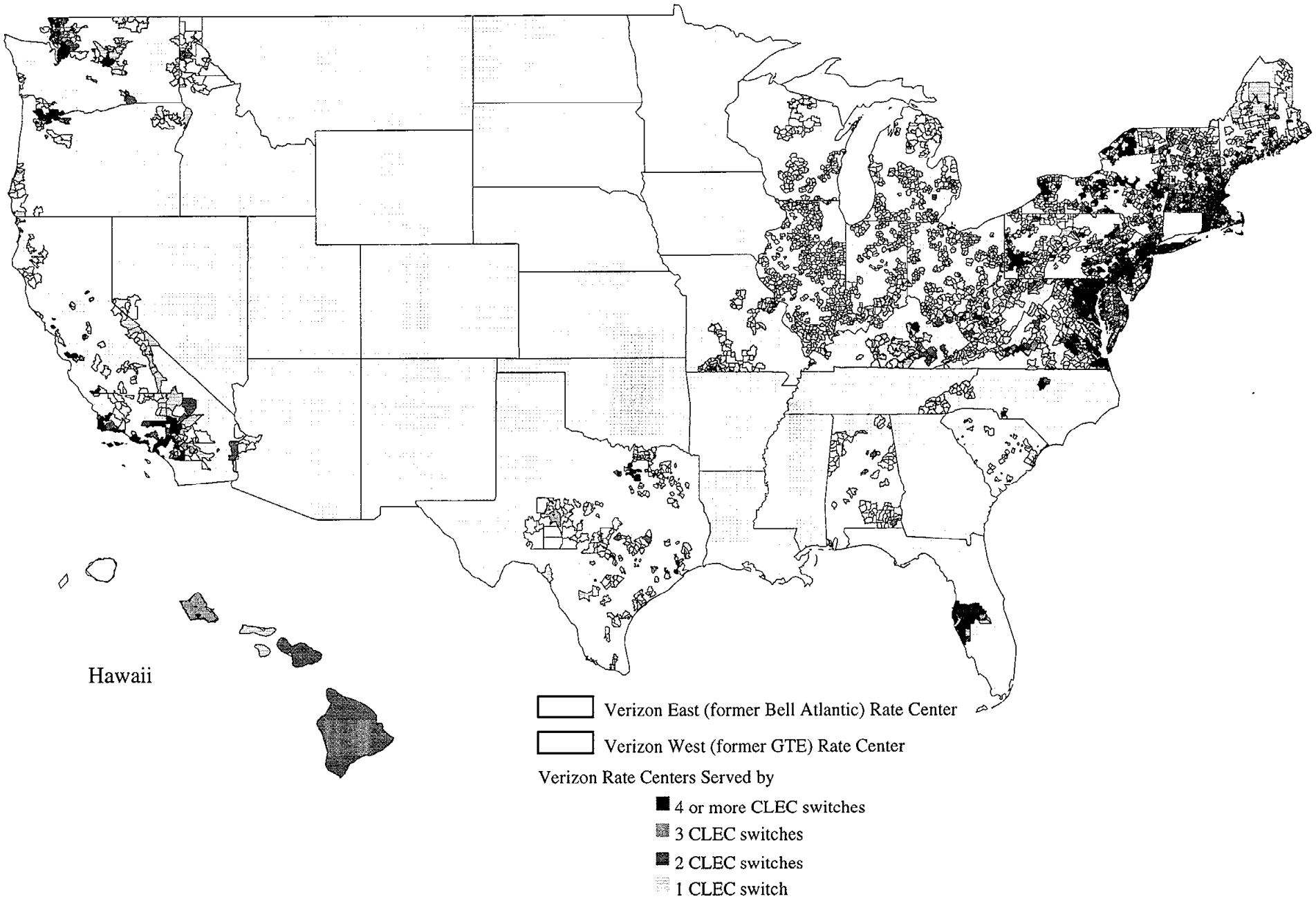
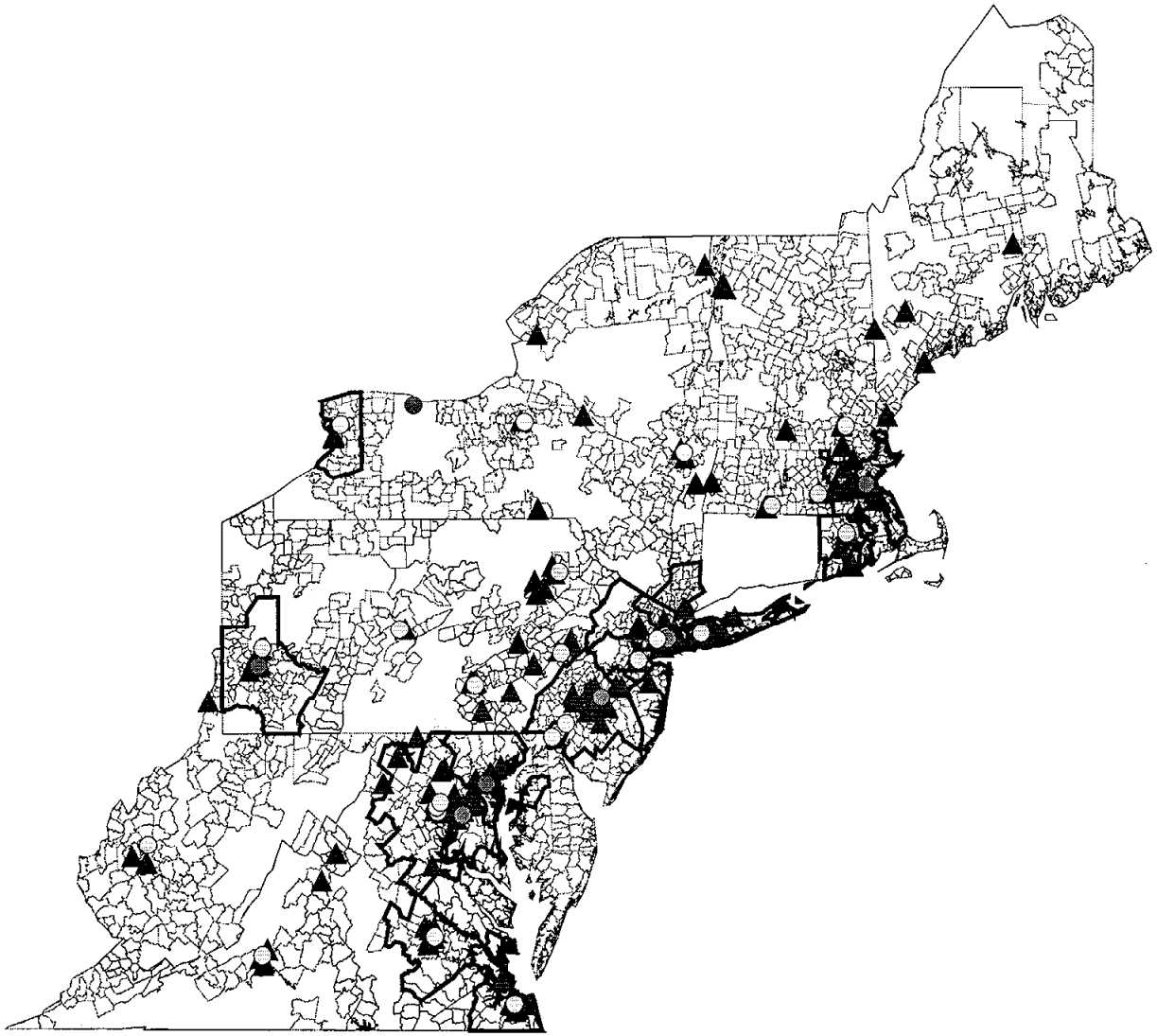
Map 1. CLEC Switches in Verizon's Region



Map 2. Rate Exchange Areas Served by CLEC Switches



Map 3. CLEC Switches in Verizon East's Region



▲ **CLEC Voice Switch** (serving Verizon Rate Centers)

CLEC Data Switches

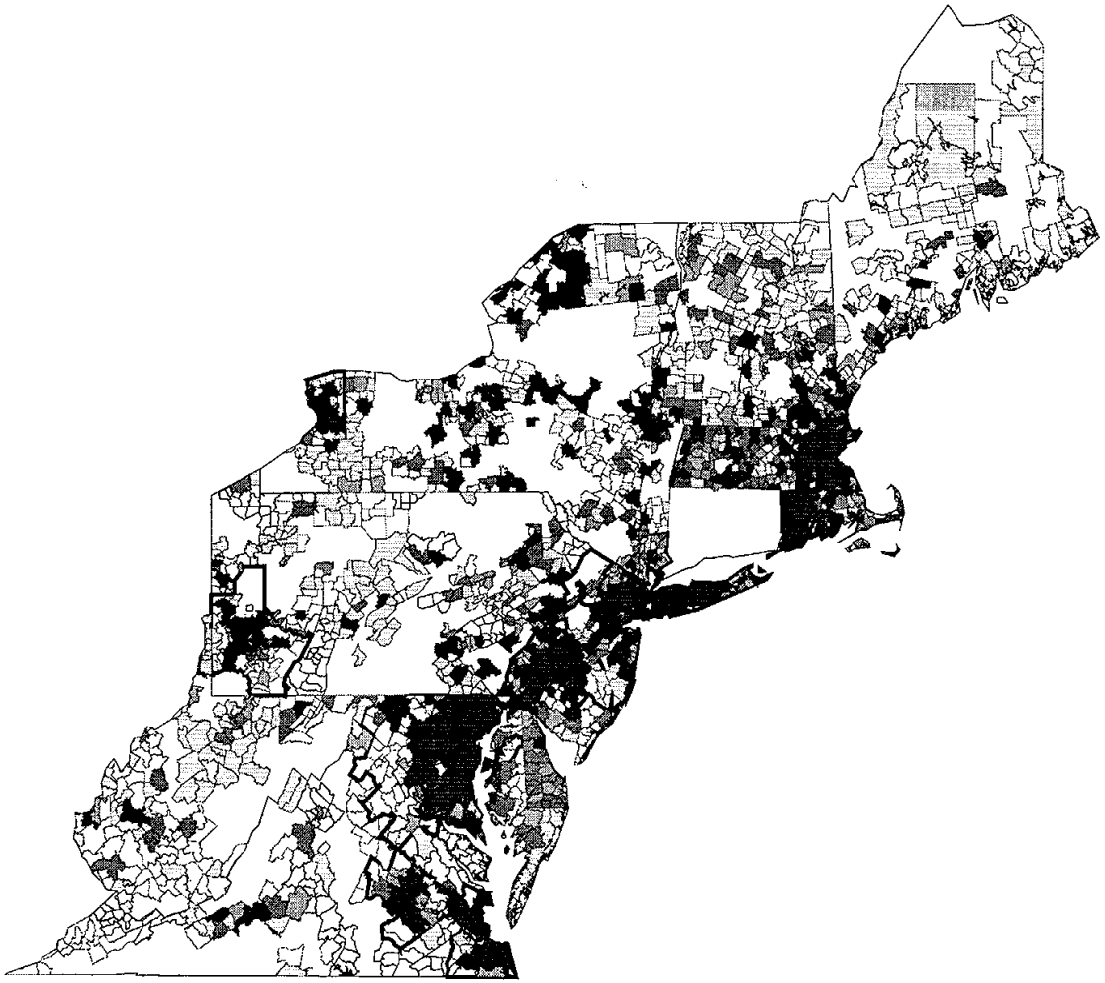
- ● 21+
- ● 11 to 20
- ○ 6 to 10
- ○ 1 to 5

Top 15 Verizon East MSA

Verizon West (former GTE) Rate Center

Verizon East (former Bell Atlantic) Rate Center

Map 4. Rate Exchange Areas Served by CLEC Switches in Verizon East's Region



Verizon East (former Bell Atlantic) Rate Center

Verizon West (former GTE) Rate Center

Verizon Rate Centers Served by

- 4 or more CLEC switches
- 3 CLEC switches
- 2 CLEC switches
- 1 CLEC switch