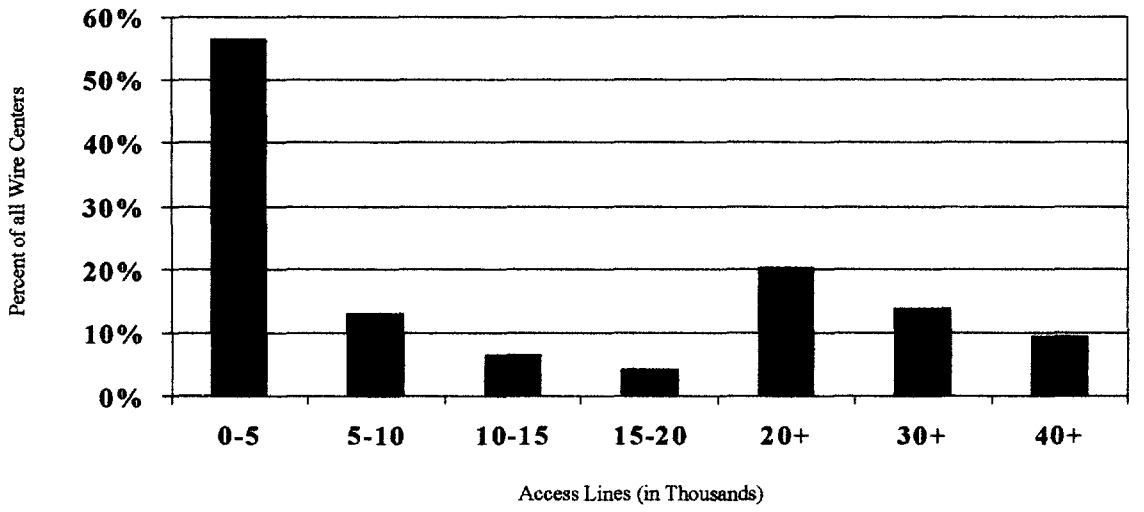
II. Interoffice Transport

II. INTEROFFICE TRANSPORT

The FCC has defined the interoffice transport UNE to comprise links between ILECs' and requesting carriers' wire centers or switches, and between ILEC switches.[1] The availability of competitive interoffice transport is most reasonably evaluated at the level of the individual "wire center serving area." A "wire center" is an end office where local loops terminate at an ILEC switch.[2] A "wire center serving area" is the geographic area served by those loops.[3] *See* Figure 1.

Figure 1. RBOC and GTE Wire Center Distribution by Size



Local competitors began deploying fiber networks in urban markets nearly 15 years ago. Since 1996, both the number of alternative suppliers of interoffice transport, and the areas served by such suppliers, have grown significantly.

For the reasons set out below, it is reasonable, and conservative, to conclude that competitive interoffice transport is available to and from ILEC wire centers that (a) contain competitive fiber and (b) have attracted one or more collocated CLECs. We have been able to establish – conservatively, and with a high degree of confidence, that CLEC collocation in "dense" wire centers is a very reliable indicator of the presence of competitive fiber in those wire

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

[2] *See Newton's Telecom Dictionary* 671 (11th ed. 1996).

[3] *See id.* Wire centers vary widely in size, from fewer than 500 lines in rural areas, to over 300,000 in the most densely populated urban areas.

centers. A reasonable threshold for "dense" wire centers lies in the range of 20,000+ to 40,000+ lines served, but varies from region to region.

A. Economic and Regulatory Background

When the Bell System was broken apart in 1984, the objective was to separate actually or potentially competitive portions of the national network from those that were still thought to be part of a natural economic monopoly.[4] MCI argued at that time that the dividing line lay at the Class 5 switch.[5] In other words, it maintained that the entire interoffice transport market – all transport currently encompassed by the FCC's interoffice transport UNE – was capable of attracting facilities-based competitors – companies like MCI itself. Though its own network was still quite limited at the time, MCI enthusiastically endorsed that conclusion. Delineating between local and long-distance at the level of the Class 5 switch, MCI insisted, was a practice "well-established in the telecommunications industry."[6]

To accelerate entry into the long-distance market, however, the Department of Justice decided to draw the initial line one tier higher up in the network – at the level of the Class 4 switch. LATAs were defined accordingly.[7] The Department adopted 100,000 telephone stations as the "guideline minimum size" for a LATA.[8]

The Department and Judge Greene recognized, however, that competition could extend well below that level, and they welcomed the possibility.[9] State regulators began to reach similar conclusions soon thereafter.[10] New York authorized interoffice competition in 1985,[11] and that year Teleport built facilities in lower Manhattan, where the most concentrated wire centers in the nation reside. By 1990, CLECs had deployed 20 networks in 15 cities.[12] In 1991, the FCC

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[4] The decree accordingly restricted the BOCs "from engaging in any non-monopoly business so as to eliminate the possibility that they might use their control over exchange services to gain an improper advantage over competitors in such businesses." *United States v. AT&T*, 552 F. Supp. 131, 143 (D.D.C. 1982).

[5] *See* Objections of MCI Communications Corporation to Application for Approval of Exchange Areas, *United States v. Western Elec. Co.*, No. 82-0192 (D.D.C. Nov. 3, 1982).

[6] *Id.* at 9.

[7] No LATA was to "be smaller than the geographic region . . . served by an existing AT&T Class 4 Office." Competitive Impact Statement at 30, *United States v. Western Elec. Co.*, No. 74-1698 (D.D.C. Feb. 10, 1982).

[8] *See* Response of the United States to Comments Received on the BOC LATA Proposals at 16-17, *United States v. Western Elec. Co.*, No. 82-0192 (D.D.C. Nov. 23, 1982).

[9] *See, e.g.*, *United States v. AT&T*, 552 F. Supp. at 175 & n. 185 ("eventually . . . bypass technology may permit interconnection to all subscribers. . . . If and when bypass technology becomes technically and economically feasible for widespread use, it should have the effect of reducing telephone costs and charges across the board, to the benefit of consumers, the economy, and the nation."); Competitive Impact Statement at 31, *United States v. Western Elec. Co.*, No. 74-1698 (D.D.C. Feb.10, 1982) ("Technological change presently underway, however, may cause the local distribution function of the divested BOCs to lose its monopoly character and, perhaps, eventually result in its deregulation.").

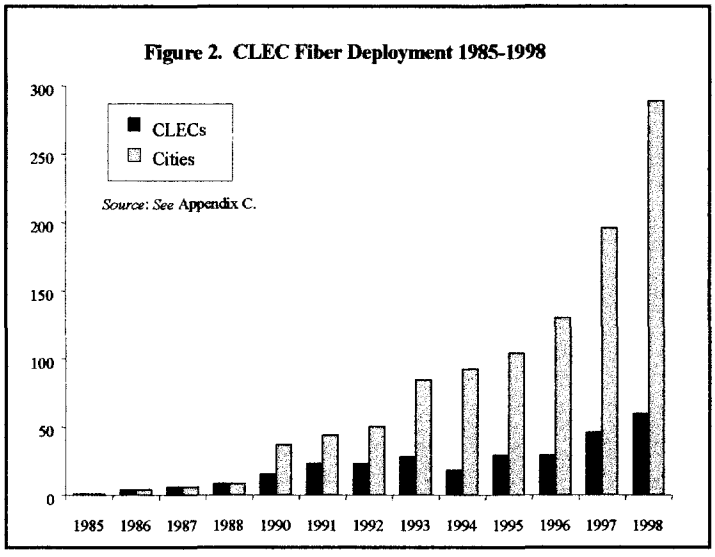
[10] By August 1986, sixteen states had decided to permit intraLATA competition. *See* Semilof, *IntraLATA Competition: Lata Barrier Falls*, Network World, Aug. 25, 1986, at 11.

[11] *See* Case 28891, *Teleport Communications* (NYPSC Jan. 7, 1985).

[12] *See* U.S. Department of Commerce, *U.S. Industrial Outlook* at 33-7 (1990).

found that "[r]ecent changes" – "most importantly, fiber optic technology" – "have facilitated the development of competition in the provision of [local access] facilities and services."[13]

In 1994, in its *Expanded Interconnection* proceedings, the Commission again recognized both the feasibility and the actuality of competition in the local market for interoffice transport. "[I]nterconnectors now are able to provide special access and switched transport transmission services in competition with the LECs,"[14] the Commission found. The underlying economics of the interoffice transport market, the Commission concluded, suggested that competition "could develop more rapidly than"[15] it previously had in long-distance markets. And indeed, by 1995, 29 CLECs had deployed fiber-optic networks in 104 cities. *See* Figure 2. Again in 1996, in its *Local Competition Order*, the FCC expressly found that "there are alternative suppliers of interoffice facilities in certain areas."[16]



[13] *Expanded Interconnection with Local Telephone Company Facilities*, Notice of Proposed Rulemaking and Notice of Inquiry, 6 FCC Rcd 3259 (1991).

[14] *Expanded Interconnection with Local Telephone Company Facilities*, Third Report and Order, 9 FCC Rcd 2718, 2719 ¶ 4 (1994).

[15] *Expanded Interconnection with Local Telephone Company Facilities*, Report and Order and Notice of Proposed Rulemaking, 7 FCC Rcd 7369, 7380 n.37 (1992).

[16] *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, First Report and Order, 11 FCC Rcd 15499, ¶ 441 (1996). *See also Applications of NYNEX Corporation Transferor, and Bell Atlantic Corporation Transferee, for Consent to Transfer Control of NYNEX Corporation and Its Subsidiaries*, Memorandum Opinion and Order, 12 FCC Rcd 19985, 20042 ¶ 111 (1997) ("there are already a number of competitors offering [transport] services, and individual interexchange carriers (including MCI) often choose particular providers to carry large amounts of traffic on a dedicated basis.") (*"Bell Atlantic/NYNEX"*); *1993 Annual Access Tariff Filings*, Memorandum Opinion and Order, 1997 FCC LEXIS 4665 (rel. April 17, 1997) (transport services "face increasing competition").

Since 1996, the availability of alternative facilities has continued to grow rapidly. New competitors such as Qwest, Level 3, Enron, MFN, and IXC "are in the midst of a fiber-building frenzy."[17] Electric utilities – which "own the third-largest telecom infrastructure in the nation"[18] – and cable companies[19] have also sold fiber to CLECs.[20] Dark fiber has become a commodity that CLECs can purchase in a rapidly expanding wholesale market.[21] *See* Table 1. The use of fixed wireless radio technologies also has grown rapidly.[22] As described below, companies like WinStar and Teligent have built local networks using predominantly fixed wireless links, while established CLECs such as AT&T and MCI WorldCom are using fixed wireless connections to extend their existing fiber networks. (*See* Table 3, infra.)

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[17] J. Akasie, *Lighting Up*, Forbes, Apr. 19, 1999.

[18] *Id.*

[19] *See, e.g.*, Frontier Communications Press Release, *Frontier Turns Up Western Half of the "Optronics" Network; Capacity Swap with WTCI Adds 1,661 Network Miles and a Third Ring in the Northwest*, June 22, 1998 (discussing Frontier's exchange of fiber with TCI subsidiary on the Seattle-Billings-Denver route); Williams Press Release, *Williams Acquires High-Capacity Fiber Route from MediaOne, Extends National Network to Key Southeast Markets*, July 27, 1998 (describing Williams' purchase of fiber in Florida from MediaOne).

[20] *See, e.g. id.* (Montana Power's subsidiary, Touch America, wholesales fiber); American Electric Power, *AEP Communications*, http://www.aep.com/global/communications/comm.html (American Electric Power wholesales fiber capacity to IXCs, CLECs and wireless providers); ICG Communications, *ICG Telecom Group*, http://www.icgcom.com/telecom/corpinfo/AboutUs.html; ICG Communications Press Release, *ICG Communications Announces Fiber Network Project in Atlanta*, Jun. 11, 1997 (ICG acquires fiber from Southern California Edison, Alabama Power, and American Electric Power).

[21] According to some estimates, "35% of the fiber already in the ground is 'dark.'" C. Mack, *Fiber Frenzy*, Forbes, Apr. 19, 1999, at 252. Since June 1998, "the wholesale spot price of bandwidth is down 35%, thanks to ample supply." *Id.* Bandwidth is now sold as a commodity through numerous clearinghouses, including Arbinet, AT&T Global Clearinghouse, GRIC Communications, IXTC WweXchange, and Ratexchange RTBX. *See* K. Henderson, *Market Makers Push "Telecommodities,"* Phone+ Magazine, Dec. 1998.

[22] The FCC recognized as early as 1991 that wireless radio was being used to bypass LEC networks. *See, e.g.*, *Expanded Interconnection with Local Telephone Company Facilities*, Notice of Proposed Rulemaking and Notice of Inquiry, 6 FCC Rcd 3259 n.3 (1991) (End users also use microwave and other radio-based facilities in lieu of LEC access services in some cases."); *see also Expanded Interconnection with Local Telephone Company Facilities*, Report and Order and Notice of Proposed Rulemaking, 7 FCC Rcd 7369, 7372 ("technological advances" such as "fiber optic and radio networks" "compete with existing LEC services.").

Table 1. Major Suppliers of Dark Fiber		
	Fiber Network	**CLEC Purchasers**
Frontier Corp.	20,000 route miles planned (interconnecting 120 major cities), 57 percent lit	• Level 3 Communications (8,300 route miles of fiber)
GST Telecommunications	5,751 route miles (including network currently under construction)	• FTV (owned by Williams, Enron, and Touch America) (745 route miles in California)
IXC Communications	10,200 route miles (16,400 miles by the end of 1999) IXC is currently in 36 of the top 50 MSAs and 57 of the top 100 MSAs	• Electric Lightwave (20 years, $101 million and 2,800 route miles of fiber) • Telco Communications Group (3 years) • STAR Telecommunications (20 years, $31 million, covering Los Angeles, Dallas, Atlanta, Miami, Phoenix and other areas) • Digital Teleport ($33 million, 3 years) • Level 3 Communications (7,355 route miles of fiber) • Time Warner (2 years) • RSL Communications (10 years)
Level 3 Communications	1,300 route miles (nearly 16,000 mile intercity network by first quarter of 2001)	• INTERNEXT ($700 million for capacity over the entire route) • PSINet (3 year, 10,000 miles)
Metromedia Fiber Network	650 route miles/230,000 fiber miles (expanding to over 1 million fiber miles)	• Allegiance (Dallas and New York) • Time Warner (20 years in the New York/New Jersey metropolitan areas) • Intermedia ($56 million, covering Boston, Chicago, New York, Philadelphia, San Francisco, Silicon Valley and Washington) • Hyperion (Chicago, New York and Washington) • e.spire ($29 million, covering New York, Philadelphia and fibers on the New York to Baltimore intercity corridor) • WinStar (25 years, $40 million, covering Chicago, New York, Washington, Philadelphia, and San Francisco)
Qwest Communications	15,000 route miles (18,815 by mid-1999)	• Advanced TelCom Group ($63 million, 7 years) • STAR Telecommunications (20 years, $85 million) • Sprint • MCI • AT&T • ELI ($122 million)
Williams Communications	20,000 route miles (32,000 route miles connecting 125 cities by the end of 2000)	• WinStar ($640 million for four strands of fiber over approximately 15,000 route miles) • Intermedia (20 years, $450 million, IRU on nationwide network) • Frontier ($68 million and 3,000 route miles through Houston, Atlanta, Tampa and Miami) • UniDial

B. A Methodology for Determining Where CLEC Fiber Offers an Alternative to ILEC Interoffice Transport

CLECs have deployed fiber in all major metropolitan areas, and the overwhelming majority of second and third tier markets. Indeed, CLEC fiber networks extend far beyond the level of "interoffice" transport – these networks serve not only ILEC and CLEC offices, but a great number of private switches too. Indeed, they serve nearly 15 percent of all commercial office buildings in the country.[23]

Since 1996, the number of CLECs that have deployed fiber networks has grown from 29 to 60, and the number of cities served by this fiber has grown from 130 to 289. *See* Figure 2. Within the top 50 MSAs, CLECs have deployed nearly 30,000 miles of fiber. *See* Appendix A. Forty seven of the top 50 MSAs are served by at least three CLEC fiber networks; 29 are served by five or more CLECs; 16 are served by seven or more.[24] *See* Appendix A. CLECs have deployed fiber in all but 15 of the MSAs ranked between 51 and 150.[25] *See* Appendix B.

CLEC fiber provides competitive interoffice transport to the ILEC wire centers that it reaches. CLEC fiber invariably reaches all major interexchange carrier POPs as well. And CLECs can provide transport between the ILEC switches to which they connect, by using the CLEC switch as a tandem. In practice, however, there is little if any use of the UNE for transport between pairs of ILEC switches.[26] CLECs that require transport among ILEC switches generally hand off the traffic to the ILEC. CLECs actually use the interoffice transport UNE mainly to make connections: (1) between a CLEC switch and an ILEC switch, or (2) between CLEC facilities collocated in an ILEC central office and an interexchange carrier point of presence (POP).

Nobody doubts that competitive alternatives are available in some segments of the market for interoffice transport. The practical difficulty lies in determining precisely where. Regulators do not maintain comprehensive maps of precisely where CLEC fiber routes run nationwide.[27] The maps that are available quickly become obsolete – this is a very dynamic market, and CLECs are continuously extending their networks.

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[23] *Compare* New Paradigm Resources Group, *1999 CLEC Report,* at Ch. 6 p. 23 (10th ed. 1999) ("*1999 CLEC Report*") (104,097 office buildings served by CLECs) *with* U.S. Dep't of Commerce, *Statistical Abstract of the United States 1998*, 118th ed., at Table 1229 (Oct. 1998) (705,000 commercial office buildings nationwide).

[24] Royce Holland, CEO of Allegiance Telcom, states: "In Tier I markets today there is a tremendous glut of capacity." W.T. Scott, et al, ING Baring Furman Selz LLC, Investext Rpt. No. 2787890, *Telecommunications/Fiber Vs. Fiberless* (Sept. 30, 1998).

[25] MSAs 51-150 range in population from 489,000 to 1.1 million. *See* Rand McNally, *Commercial Atlas & Marketing Guide 1999*, 130th ed. at 60 (1999).

[26] The only important exception is when one of the ILEC switches is collocated with an IXC POP.

[27] The FCC, for example, collects information only on the amount of fiber CLECs have deployed, not on where it has been deployed. *See* J. Kraushaar, *FCC Fiber Deployment Update End of Year 1997* at 2 (Sept. 1998). Moreover, CLECs generally do not provide this information. For example, at least 65 of approximately 120 facilities-based CLECs profiled in the *1999 CLEC Report* do not even report how much fiber they have in each city they serve, and only a handful of CLECs provide fiber maps of any variety. *See 1999 CLEC Report* at Ch. 11.

But complete maps are not needed. Both the ILECs and the Commission compile reliable data, frequently updated, on where CLECs have obtained collocation.[28] And we have been able to establish – conservatively, and with a high degree of confidence, that CLEC collocation in "dense" wire centers is a very reliable indicator of the presence of competitive interoffice transport.[29] Different ILECs serve different demographic areas, and what constitutes a "dense" wire center in each ILEC's territory may therefore vary. In the following analysis, we present three alternative definitions of "dense" wire centers: centers with 20,000+, 30,000+, and 40,000+ lines.

A CLEC that is going to provide its own interoffice transport will, with very few exceptions, initiate the transport at a collocation cage.[30] Royce Holland, one of the founding fathers of the CLEC industry, describes the strategy as follows:

> We enter the market and put in switches, routers, both central office and frame-relay switches. We co-locate in a huge number of COs. We've targeted over 500 central offices to be in within the next few years. It represents a huge addressable market and then we go out and lease capacity initially, and as we reach the crossover point in terms of traffic, we either lease dark fiber or overbuild it. For instance, in New York, the crossover point is 40,000 lines. We have already moved to stage two, in which we acquired dark fiber from Metromedia Fiber Network.[31]

It therefore makes sense to begin any analysis of competition for interoffice transport with the fact of collocation. The FCC's December 1998 *Local Competition Report* finds that CLECs (as of mid-year 1998) had operational collocation arrangements in some 5000 wire centers.[32]

Three major ILECs – Bell Atlantic, SBC, and U S WEST – have compiled quite comprehensive, and reasonably current information on CLEC fiber routes within their regions.[33] These fiber-route maps can be superimposed on top of the corresponding ILEC wire-center-boundary maps. And we can superimpose maps that show which wire centers have attracted

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[28] All proprietary information regarding competitors' taking of collocation and ILEC UNEs was kept strictly confidential, and is presented only in aggregate form in this report.

[29] Under the FCC's *Expanded Interconnection* regime, CLECs were indeed required to bring in fiber to central offices in which they obtained collocation. *See, Expanded Interconnection with Local Telephone Company Facilities*, Report and Order and Notice of Proposed Rulemaking, 7 FCC Rcd 7369, 7409-10, 7413-14 (1992).

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

[31] *Id.* (*quoting* Allegiance Telecom CEO Royce Holland).

[32] FCC, Industry Analysis Division, *Local Competition*, at 6 (Dec. 1998) ("*FCC Local Competition Report*").

[33] Together, these three BOC regions comprise 35 states and the District of Columbia and 47 percent of all BOC and GTE wire centers.

CLEC collocation. We can then count – one by one – the wire centers through which CLEC fiber passes, and in which CLECs have also obtained collocation.

What we find is a reasonably good fit between wire centers with CLEC collocation and wire center serving areas that contain CLEC fiber.[34] In SBC's region, for example, we're able to confirm that at least 90 percent of wire centers with collocation serve areas in which CLEC fiber is also found. In Bell Atlantic's region, we can confirm that the figure is at least 75 percent. In U S WEST's region, we can confirm that the figure is at least 65 percent.

This good fit becomes better still if we restrict the focus to "dense" wire centers. *See* Table 2.

Table 2. Wire Centers with Collocation by Region

	Total wire centers	Wire centers with collocation (% of total)	Wire centers with 40,000+ lines (% of total)	Wire centers with 40,000+ lines and collocation (% of total)	Wire centers with 30,000+ lines (% of total)	Wire centers with 30,000+ lines and collocation (% of total)	Wire centers with 20,000+ lines (% of total)	Wire centers with 20,000+ lines and collocation (% of total)
Ameritech	1136	341 (30%)	176 (16%)	150 (13%)	258 (23%)	198 (17%)	365 (32%)	260 (23%)
Bell Atlantic	2418	359 (15%)	302 (13%)	189 (8%)	447 (18%)	243 (10%)	669 (28%)	305 (13%)
BellSouth	1598	250 (16%)	149 (9%)	117 (7%)	244 (15%)	176 (11%)	377 (24%)	225 (14%)
GTE	3873	142 (4%)	78 (2%)	47 (1%)	138 (4%)	74 (2%)	256 (7%)	105 (3%)
SBC	2088	325 (16%)	321 (15%)	253 (12%)	410 (20%)	286 (14%)	548 (26%)	311 (15%)
U S WEST	1230	235 (19%)	138 (11%)	118 (10%)	199 (16%)	159 (13%)	285 (23%)	200 (16%)
Total:	12,343	1652(13%)	1164 (9%)	874 (7%)	1696 (14%)	1136 (9%)	2500 (20%)	1406 (11%)

For example, in wire centers with 20,000+ lines in SBC's region, collocation implies the nearby presence of CLEC fiber at least 90 percent of the time. In Bell Atlantic's region, the corresponding figure is at least 72 percent. In US West's region the figure is at least 74 percent. Analyzing instead wire centers with 30,000+ lines yields a figure of at least 91 percent for SBC, at least 81 percent for Bell Atlantic, and at least 76 percent for U S WEST. Analyzing wire centers with 40,000+ lines yields a figure of at least 92 percent for SBC, at least 80 percent for Bell Atlantic, and at least 77 percent for U S WEST.

Similar conclusions emerge from a closer study of individual markets, both large and small.

- In the Los Angeles MSA, 72 wire centers serve 40,000+ lines. Of these, 20 have at least one collocated CLEC. An analysis of fiber route maps shows that CLEC fiber passes through at least 15 of the 20 wire center areas with collocation. *See* Map 1.

[34] In some instances, our maps show fiber within a wire center serving area that does not pass straight through the wire center itself. It is reasonable, however, to include such instances as wire centers served by fiber, for two reasons. *First*, our maps are incomplete, and there may indeed be competitive fiber running directly from CLEC networks to ILEC wire centers. *Second*, to the extent that such connections do not already exist, it is clear that CLECs easily could make them, particularly in light of the short distances (within the same wire center serving area) and attractive economics (dense wire centers) involved.

- In the San Jose MSA, 17 wire centers serve 40,000+ lines. Of these, 16 have at least one collocated CLEC. An analysis of fiber route maps shows that CLEC fiber passes through at least 15 of the 16 wire center areas with collocation. *See* Map 2.

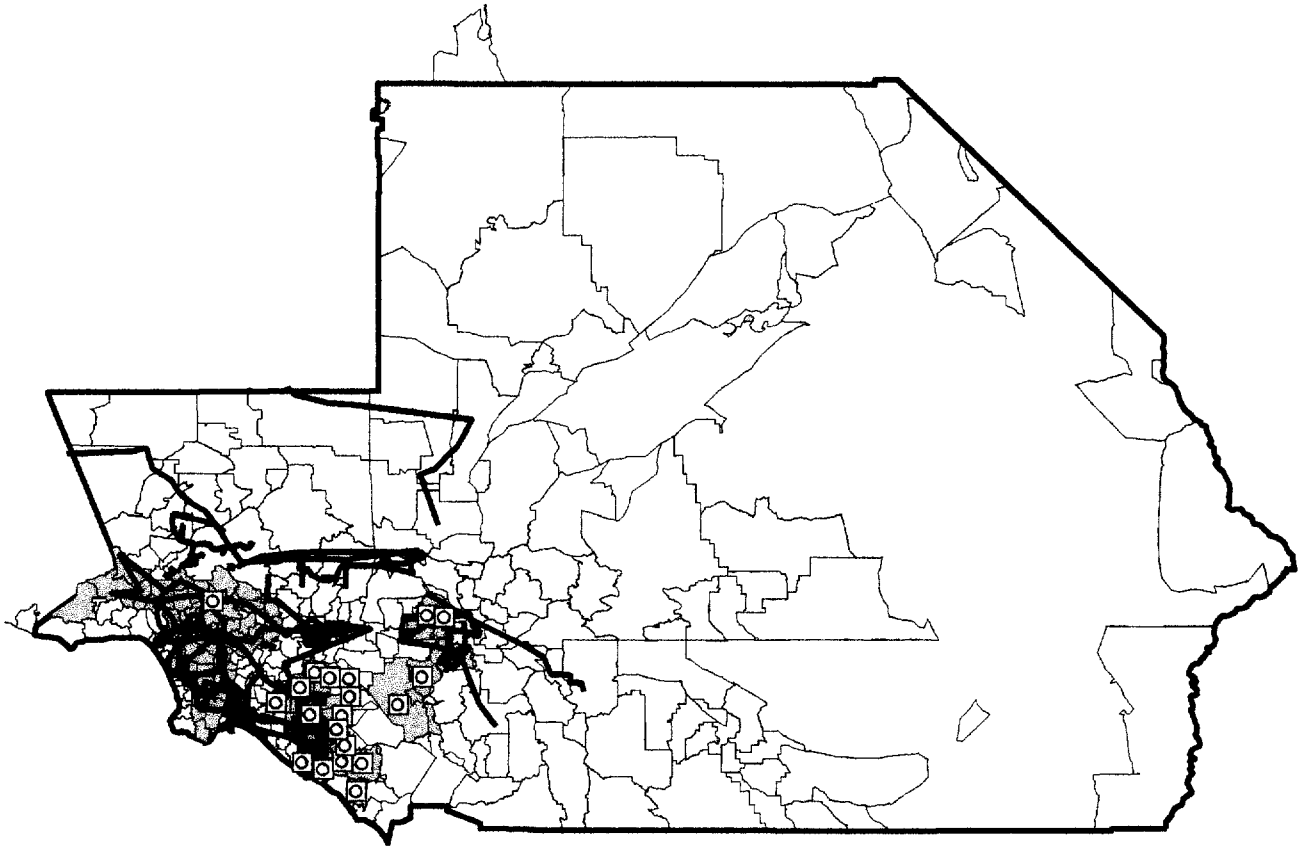
- In the Washington DC MSA, 40 wire centers serve 40,000+ lines. Of these, 34 have at least one collocated CLEC. An analysis of fiber route maps shows that CLEC fiber passes through at least 32 of the 34 wire center areas with collocation. *See* Map 3.

- In the Richmond MSA, 7 wire centers serve 40,000+ lines. All 7 have at least one collocated CLEC. An analysis of fiber route maps shows that CLEC fiber passes through at least 5 of the 7 wire center areas with collocation. *See* Map 4.

- In the Seattle MSA, 14 wire centers serve 40,000+ lines. All 14 have at least one collocated CLEC. An analysis of fiber route maps shows that CLEC fiber passes through at least 12 of the 14 wire center areas with collocation. *See* Map 5.

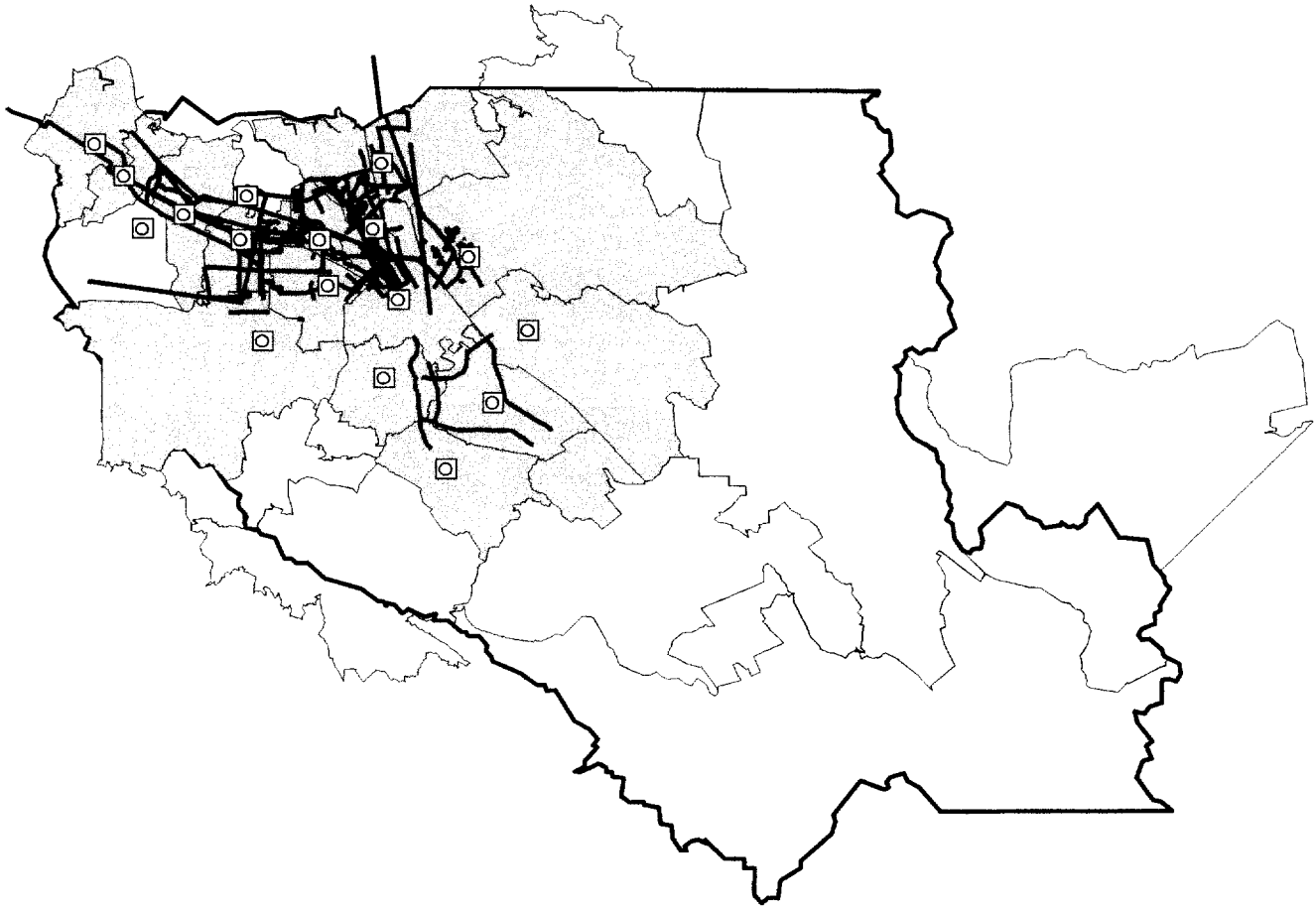
- In the Minneapolis MSA, 11 wire centers serve 40,000+ lines. All 11 have at least one collocated CLEC. An analysis of fiber route maps shows that CLEC fiber passes through at least 10 of the 11 wire center areas with collocation. *See* Map 6.

Map 1. CLEC Fiber And Collocation
Los Angeles MSA



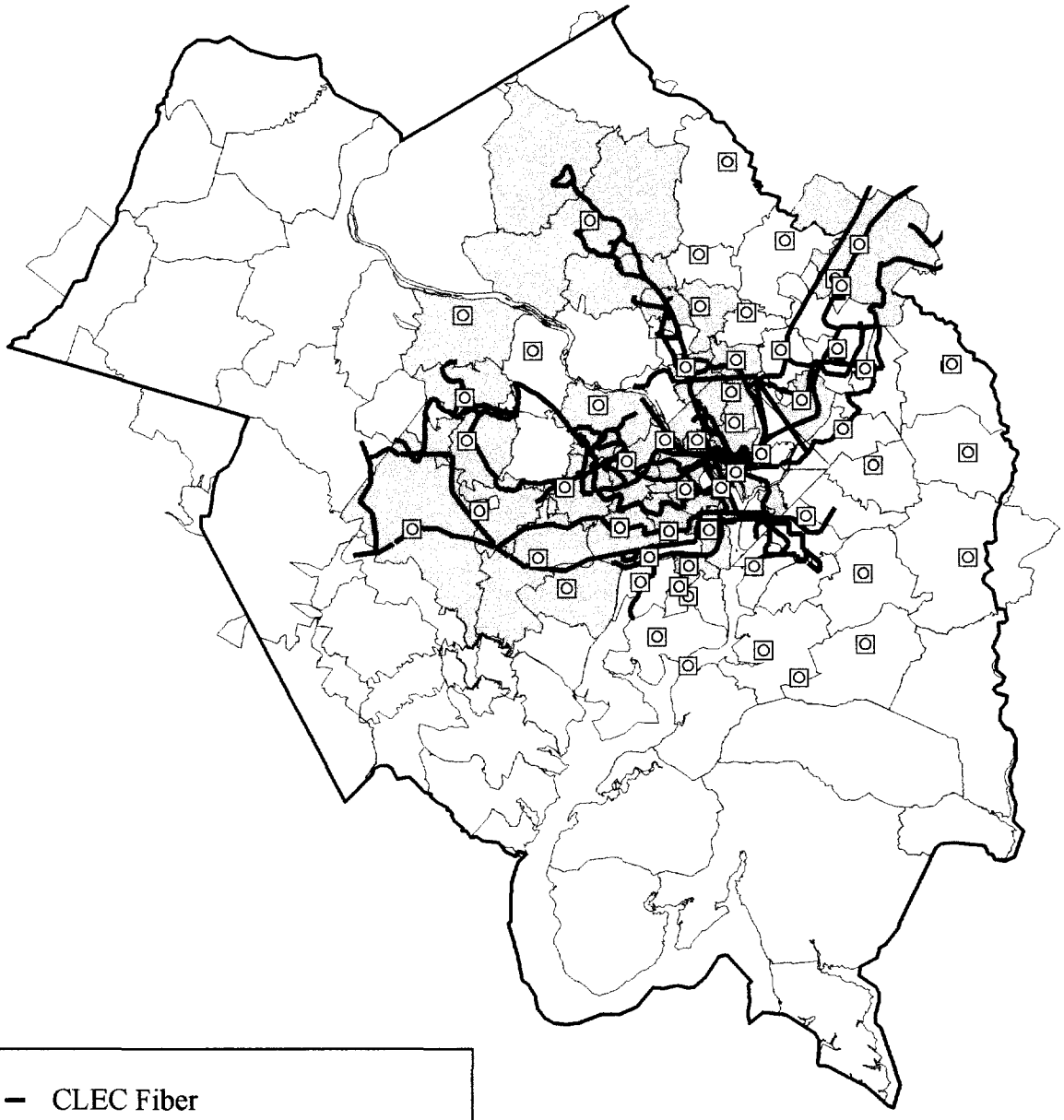
- CLEC Fiber
- Wirecenter
- Collocated Wirecenter
- Wirecenter With 40,000+ Lines

Map 2. CLEC Fiber And Collocation
San Jose MSA



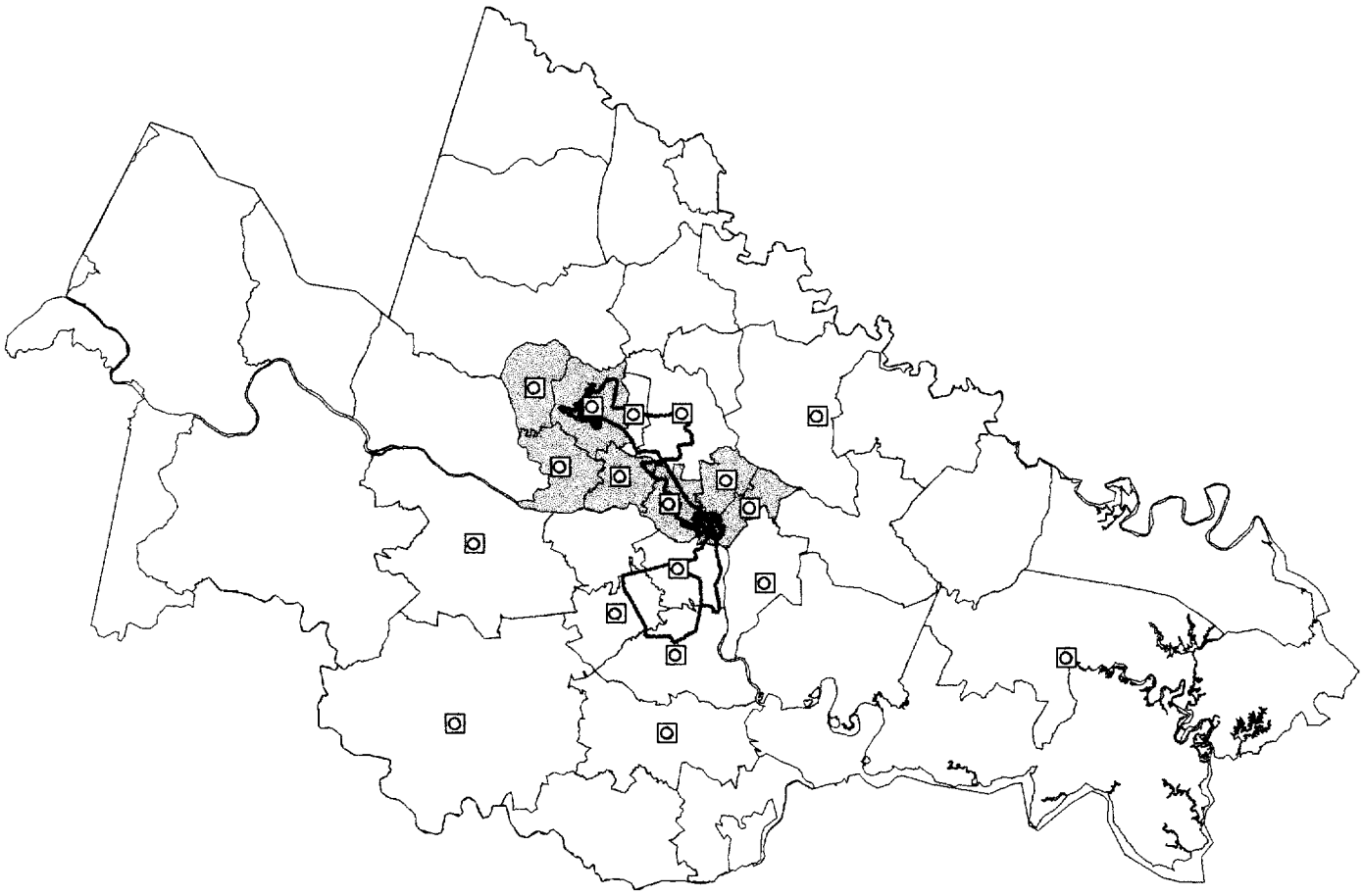
- CLEC Fiber
- Wirecenter
- Collocated Wirecenter
- Wirecenter With 40,000+ Lines

Map 3. CLEC Fiber And Collocation
Washington, DC MSA



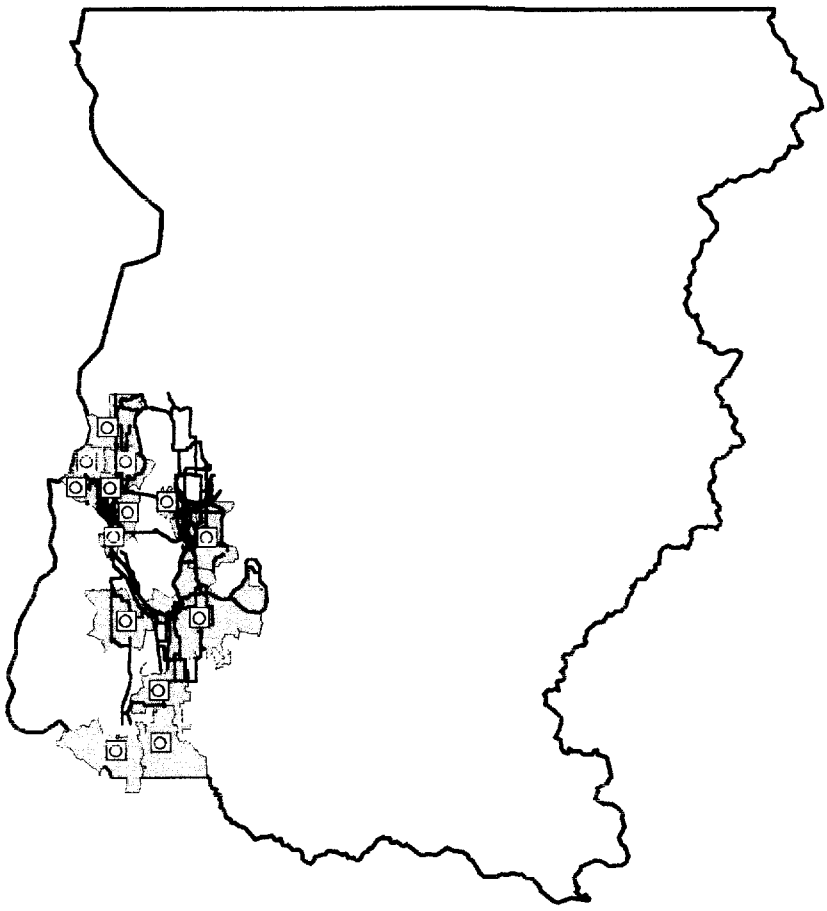
- CLEC Fiber
- Wirecenter
- Collocated Wirecenter
- Wirecenter With 40,000+ Lines

Map 4. CLEC Fiber And Collocation
Richmond MSA



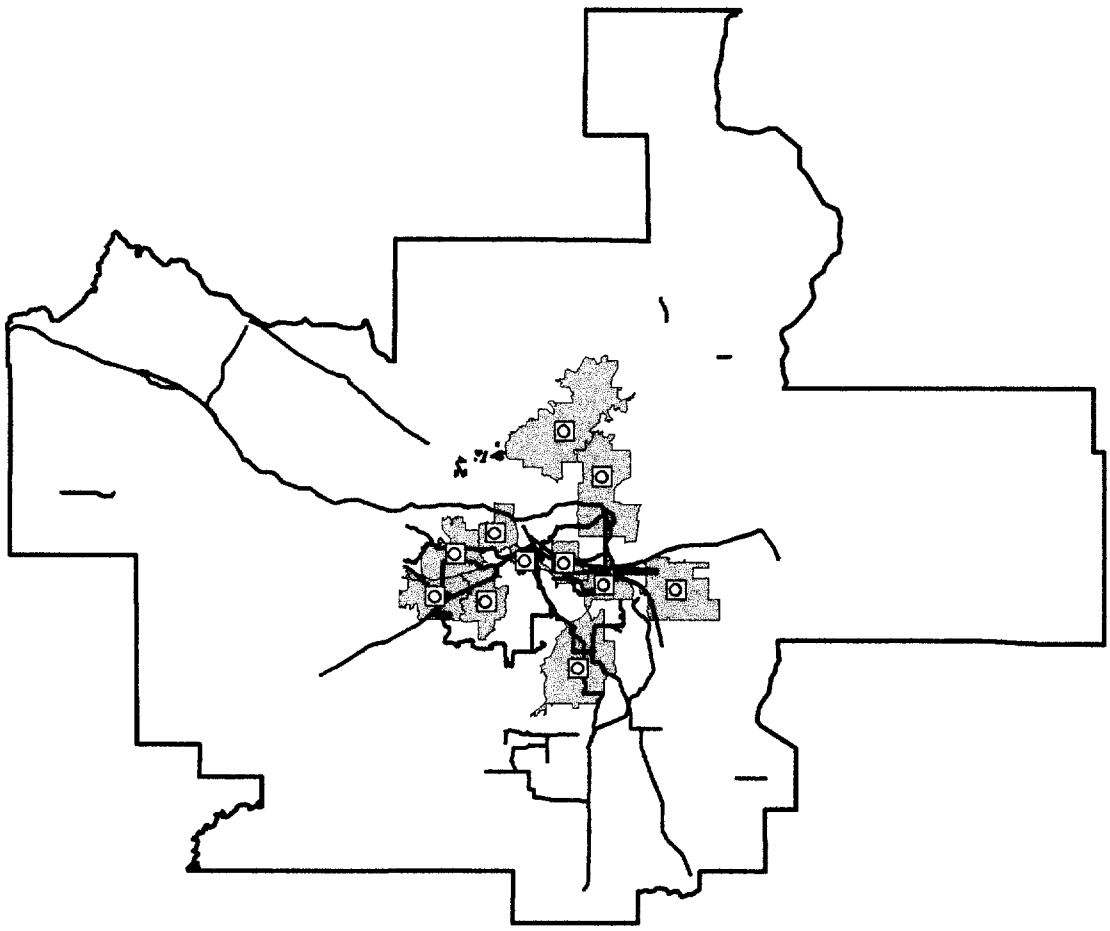
- CLEC Fiber
- Wirecenter
- Collocated Wirecenter
- Wirecenter With 40,000+ Lines

Map 5. CLEC Fiber And Collocation
Seattle MSA



- CLEC Fiber
- Wirecenter
- Collocated Wirecenter
- Wirecenter With 40,000+ Lines

Map 6. CLEC Fiber And Collocation
Minneapolis MSA



- CLEC Fiber
- Wirecenter
- Collocated Wirecenter
- Wirecenter With 40,000+ Lines

This analysis is very conservative, in several important respects.

To begin with, the available fiber maps are by no means a complete representation of all CLEC and third party fiber. They do not include the fiber of all CLECs within a given area. The maps generally do not include fiber that public utilities or cable companies have deployed, although CLECs often have obtained fiber from these sources. The maps were prepared at least 6-9 months ago, and do not include fiber constructed since this time, or fiber that is now under construction. The fiber routes themselves are incomplete, and do not include many network spurs off of the main rings, many of which may run across wire center boundaries to a collocated central office. In sum, it is very likely that CLEC fiber actually serves even more collocated wire centers than our data indicate.[35]

Second, we are considering here only fiber-optic interoffice transport. Other transport technologies are available, and are used as well. Numerous CLECs have long used wireless radio and microwave technologies to extend their networks.[36] This trend has accelerated rapidly in the past few years. Several CLECs – WinStar, Teligent, and NEXTLINK – are using fixed wireless connections in lieu of fiber to provide high-capacity connections.[37] AT&T, MCI WorldCom, and Sprint all have made substantial recent investments in such technology to enhance their competitive local networks,[38] as have many other CLECs.[39] *See* Table 3.

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[35] Moreover, our analysis ignores the fact that CLECs may have fiber and serve customers in wire centers in which they do not obtain collocation.

[36] In 1994, TCG advertised that "A Boston customer...didn't have time to wait for us to reach him with fiber. So we connected his office to our network through a microwave facility until the fiber loop was installed." TCG, *The People Behind a Decade of Vision in Local Telecommunications: 1984-1994* (1994).

[37] *See, e.g.*, WinStar, *Carrier Services,* http://www.winstar.com/indexCarrServ.htm (WinStar's Wireless Fiber offers other carriers "a quick and cost-efficient solution for extending the reach of an existing fiber ring providing local transport."); N. Swartz, *InTeligent Challenger*, Mar. 15, 1999, http://www.teligent.com ("We can put somewhere between four T1s worth of capacity all the way up to a DS3 worth of capacity in a building.") (quoting Keith Kaczmarek, Teligent senior vice president, engineering & operations); NEXTLINK Press Release, *NEXTLINK Closes WNP Acquisition*, Apr. 27, 1999 (NEXTLINK will use LMDS "to build fixed wireless extensions to its local fiber optic networks planned to cover most major cities in the United States.").

[38] With its purchase of TCG, AT&T acquired 38 GHz licenses that cover more than 200 U.S. markets, including 95 of the 100 largest domestic markets. *See Teleport Prepares to Take on WinStar in 38 GHz CLEC Market*, Communications Today, Nov. 3, 1997. MCI WorldCom recently acquired CAI Wireless. *MCI Inks $414 M Deal to Buy CAI*, Times Union, Apr. 20, 1999, at E1. Sprint has acquired People's Choice TV and American Telecasting, which provide Sprint a "wireless alternative to deliver advanced communications services to [its] customers." Sprint Press Release, *Sprint Agrees to Acquire American Telecasting, Inc.*, Apr. 27, 1999. Sprint has also purchased VideoTron USA and Transworld, which both have fixed wireless licenses.

[39] *See, e.g.*, ART Press Release, *Advanced Radio Telecom and Electric Lightwave Execute Strategic Agreement*, Mar. 14, 1997 (ELI purchased wireless transport from ART).

Table 3. Use of Wireless Technology to Extend CLEC Networks		
	Wireless Coverage	Wireless Strategies
WinStar	28- and 38-GHz licenses in 160 markets nationwide	"WinStar's 'Wireless Fiber' service offers a flexible and profitable alternative for extending the reach of an existing fiber ring or providing local transport."
Teligent	24-GHz licenses in 74 markets	Teligent CEO Alex Mandl: "When I decided to do this more than two years ago, there weren't a lot of people who even knew what [fixed wireless] is...Today, I think everybody in the industry recognizes that fixed-wireless networks and point-to-multipoint networks will be a very important part of how the industry will evolve."
NEXTLINK	39 A Block LMDS licenses and 1 B Block LMDS license, with 114 million POPs, and coverage of 95% of the top 30 markets.	"NEXTLINK is well positioned to leverage its unique combination of assets, including its growing number of metropolitan fiber networks, its fixed broadband wireless spectrum, and the high-speed IP-centric fiber backbone connecting over 50 cities in the U.S. and Canada that is currently under construction."
Advanced Radio Telecom (ART)	38 GHz licenses in 90 of the top 100 U. S. markets and 210 markets nationwide.	"By integrating its own fixed wireless national spectrum assets with fiber optic transport, ART is capable of serving the vast majority of businesses that do not have direct fiber connectivity."
AT&T	Through AT&T's acquisition of TCG/BizTel, it gained 38-GHz Licenses in 213 geographic regions and 95 of the top 100 largest markets.	38-GHz licenses allow us to "bring TCG's service to customers that cannot be served economically with fiber optics. Thus we can expand our geographic reach using our own facilities predominantly, and achieve higher penetration in all communities we serve."
MCI WorldCom	Acquired CAI Wireless for $483 million (licenses in New York City, Rochester and Albany, N.Y.; Philadelphia, Washington and Norfolk/Virginia Beach, Va. Long Island, Buffalo and Syracuse, N.Y., Providence, R.I., Hartford, Conn., Boston, Baltimore and Pittsburgh). CAI Wireless also has a 94% stake in CS Wireless, with licenses in 10 markets. Invested $200 million combined in Wireless One (licenses in 80 markets); Heartland Wireless (licenses in 90 markets); CAI Wireless (14 markets); and CS Wireless (10 markets). Signed a five-year national agreement with WinStar for "Wireless Fiber."	Ernest D. Yates, Wireless One Executive VP and Chief Operating Officer: "Wireless data services . . . offers affordable alternatives to traditional local loop services for the 'last mile' connections." Nate Davis, Senior VP, Network Operations and Chief Operating Officer, MCImetro: "We're excited about the potential of WinStar's Wireless Fiber service. It will allow us to expand our network reach and provide more choices for MCI customers."
Sprint	Acquired People's Choice TV for $469 million (licenses in Chicago, Detroit, Indianapolis, Houston, Phoenix, St. Louis, Milwaukee, Salt Lake City, Tucson and Albuquerque). Acquired American Telecasting, Inc. (ATI) (licenses in 55 markets). Acquired Videotron USA for $180 million and Transworld for $30 million (licenses in San Francisco, San Jose, and Oakland, Calif; Tampa, Fla.; Seattle and Spokane, Wash.; and Greenville, S.C.).	"The beauty of Sprint ION is that it is compatible with all broadband access methods. Fixed wireless is one such method, and PCTV's markets are exceptionally well-suited for deployment." "Together with our recently announced merger with People's Choice TV, this transaction gives us a wireless alternative to deliver advanced communications services to our customers," said William T. Esrey, Sprint chairman and chief executive officer. "[W]e will be able to greatly extend the reach of Sprint's Integrated On-Demand Network to consumers and small businesses."
Electric Lightwave	3-year agreement for 300 wireless paths (equivalent to 1200 DS-1 circuits) in the Pacific Northwest.	ELI President David Sharkey: "Our relationship with ART allows us to move quickly into our planned market buildout, stepping up the time line."
ICG/ChoiceCom	3-year, $3.5 million agreement, for wireless DS-1 and DS-3 access in up to 10 states, including California, Tennessee, Colorado, Texas, and states in the Ohio Valley and the Southeast.	ICG President Sheldon Ohringer: "This agreement is an excellent fit with our plans to develop and expand our presence in the markets we serve."
Williams Communications	Purchased 2% of WinStar's "Wireless Fiber" capacity for $400 million.	Williams President and CEO Howard E. Janzen: "WinStar's proven ability to provide wireless T-1s, together with Williams' technologically advanced fiber-optic network, offers Williams' carrier customers an unmatched end-to-end solution."
Sources: See Appendix C		

Finally, CLECs with fiber-optic networks have made clear that they can readily extend their existing networks reasonable distances to pick up large volumes of traffic. According to TCG, "[w]hen a company signs up for the service, TCG runs fiber-optic cable from its nearest line right into the building that houses the business."[40] NEXTLINK states that they will "pay all the costs of taking the fiber optic lines" to their large business customers.[41] MFN will "bring [its] fiber right up to [its] customers' floors in their buildings."[42] Industry observers acknowledge that "[m]ost CLECs can justify running or leasing fiber facilities from their regional switching centers (RSCs) out to a central location within a community." [43]

C. Competitive Interoffice Transport by Wire Center

Using the methodology set forth above, it is a straightforward matter to determine which ILEC wire centers are served by competitive interoffice transport. As of March 1999, CLECs had operational collocation arrangements in 1407 BOC and GTE wire centers with 20,000+ lines, 1136 in wire centers with 30,000+ lines, and 874 in wire centers with 40,000+ lines. *See* Tables 4-6.

Table 4. Competitive Interoffice Transport by Region

	Wire Centers with 20,000+ Access Lines Served by:			
	1 or more CLEC collocation nodes	2 or more	3 or more	4 or more
Ameritech	260	159	105	71
Bell Atlantic	305	185	112	66
BellSouth	225	136	85	56
GTE	106	64	22	8
SBC	311	223	169	129
U S WEST	200	N/A	N/A	N/A

[40] D. Burrough, *Businesses Are Top Beneficiaries of High-Tech Telecommunications*, Phoenix Business Journal, Oct. 27, 1995, at 23.

[41] S. Cruz, *Yes, Virginia, There is Phone Competition*, Las Vegas Business Press, Aug. 10, 1998, at 19.

[42] A. Lindstrom, *Regional CLECs Plant Fiber Stakes in the Ground*, America's Network, Sept. 1, 1998.

[43] K. Kolderup, *Voice Brings New Perspective to DSL*, X-Change, Apr. 1999, http://www.x-changemag.com/articles/941feat3.html.

Table 5. Competitive Interoffice Transport by Region				
	Wire Centers with 30,000+ Access Lines Served by:			
	1 or more CLEC collocation nodes	2 or more	3 or more	4 or more
Ameritech	198	130	89	66
Bell Atlantic	243	158	101	59
BellSouth	176	115	77	55
GTE	74	49	16	8
SBC	286	216	163	127
U S WEST	159	N/A	N/A	N/A

Table 6. Competitive Interoffice Transport by Region				
	Wire Centers with 40,000+ Access Lines Served by:			
	1 or more CLEC collocation nodes	2 or more	3 or more	4 or more
Ameritech	150	109	78	59
Bell Atlantic	189	135	89	53
BellSouth	117	85	67	48
GTE	47	35	15	8
SBC	253	206	159	126
U S WEST	118	N/A	N/A	N/A

Moreover, CLECs are rapidly expanding their collocation facilities. In BOC and GTE wire centers, CLECs had 3007 collocation arrangements pending as of March 1999.[44] Of these, 2714 are within BOC and GTE wire centers with 20,000+ lines, 2312 in wire center with 30,000+ lines, and 1897 in wire centers with 40,000+ lines. *See* Tables 7-9. Factoring these collocation arrangements already underway into the results presented above will of course boost the percentages of competitively served wire centers.

[44] This figure excludes data from U S WEST.

Table 7. Competitive Interoffice Transport by Region (Based on Actual and Pending Collocation)				
	Wire Centers with 20,000+ Access Lines Served by:			
	1 or more actual *plus pending* CLEC collocation nodes	2 or more	3 or more	4 or more
Ameritech	303	220	157	116
Bell Atlantic	473	317	230	155
BellSouth	284	216	162	136
GTE	168	125	83	56
SBC	379	293	217	177
U S WEST	200	N/A	N/A	N/A

Table 8. Competitive Interoffice Transport by Region (Based on Actual and Pending Collocation)				
	Wire Centers with 30,000+ Access Lines Served by:			
	1 or more actual *plus pending* CLEC collocation nodes	2 or more	3 or more	4 or more
Ameritech	222	176	129	99
Bell Atlantic	364	265	203	140
BellSouth	212	178	141	121
GTE	109	88	64	46
SBC	334	270	210	172
U S WEST	159	N/A	N/A	N/A

Table 9. Competitive Interoffice Transport by Region (Based on Actual and Pending Collocation)				
	Wire Centers with 40,000+ Access Lines Served by:			
	1 or more actual *plus pending* CLEC collocation nodes	2 or more	3 or more	4 or more
Ameritech	161	135	108	86
Bell Atlantic	274	214	171	120
BellSouth	136	123	109	99
GTE	70	62	46	34
SBC	284	244	199	169
U S WEST	118	N/A	N/A	N/A

In the vast majority of wire centers in which CLECs have obtained collocation, they are not in fact taking the interoffice transport UNE, but instead are relying on either their own facilities, those of a third party,[45] or are leasing ILEC facilities pursuant to tariff. In SBC's region, for example, CLECs have obtained collocation in 330 wire centers, but are taking the interoffice transport UNE from SBC in only 37 wire centers.[46] In GTE's region, CLECs have obtained collocation in 142 wire centers, but are not taking the interoffice transport UNE in any of them.

In 1982, the Department assumed that a 100,000-customer territory (LATA) was the smallest area that could reasonably be expected to attract facilities-based service from competing interexchange carriers.[47] Solid empirical data now establishes the actuality of interoffice transport competition down to the level of many end offices. Our analysis is in fact very much more conservative than DoJ's was in 1982, because it centers on actual – not merely potential – competition. In 1982, MCI and Sprint were the only facilities-based competitive long-distance carriers of any significance, and they provided facilities-based service only in limited areas. Today, by contrast, there are over 150 facilities-based CLECs. Many have deployed fiber facilities in numerous markets across the country. And we can say with high confidence that their competitive interoffice facilities extend to dense ILEC wire centers in which CLECs have actually chosen to collocate.

As we have noted, MCI insisted in 1982 that interoffice transport could be competitive right down to the level of every Class 5 end office – and not just down to the bigger ones. Whatever the facts back then, interoffice transport is plainly competitive today, so far as larger wire centers with collocated CLECs are concerned. Entry barriers for the last mile of the interoffice market are far lower than they were for the "last LATA," back in 1982. The costs of providing transport have dropped sharply in the intervening 17 years.[48] LATAs are often hundreds of miles apart; most central offices, by contrast, are fewer than 10 miles apart. And a CLEC that collocates in a wire center can contend not just for long-distance traffic, but for all the local traffic and advanced services, too – a far larger market in terms of both dollars and traffic volumes.[49]

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[45] In Illinois, 18 CLECs are provisioning all interoffice trunks themselves or though a third party. By comparison, only eight CLECs in Illinois rely exclusively on leasing trunks from Ameritech, whereas 19 CLECs provision trunks jointly with Ameritech, or in combination with Ameritech and a third party. In Ohio, 14 CLECs are provisioning all interoffice trunks themselves or though a third party. By comparison, only five CLECs in Ohio rely exclusively on leasing trunks from Ameritech, whereas seven CLECs provision trunks jointly with Ameritech, or in combination with Ameritech and a third party.

[46] In 143 of the 330 wire centers, CLECs are obtaining unbundled loops.

[47] *See* Response of the United States to Comments Received on the BOC LATA Proposals at 16-19, *United States v. Western Elec. Co.*, No. 82-0192 (D.D.C. Mar. 23, 1982). *See also United States v. Western Elec. Co.*, 569 F. Supp. 990, 1019 n.149 (D.D.C. 1983).

[48] Even in 1982, MCI argued that "[d]igital transmission, including fiber optics systems, drastically reduces terminal multiplex costs. This permits profitable short hauls to smaller and smaller markets." Objections of MCI Communications Corporation to Application for Approval of Exchange Areas at 8, *United States v. Western Elec. Co.*, No. 82-0192 (D.D.C. Nov. 3, 1982).

[49] *See, e.g.*, K.M. Leon, et al., ABN AMRO Chicago Corp. Investext Rpt. No. 1916888, Teleport

Thus, the "most significant" CLECs in the country – AT&T, MCI WorldCom, and Sprint[50] – are today doing precisely what MCI said they could do in 1982.[51] AT&T has pursued a strategy of "migration of dedicated and terminating access facilities from LEC to TCG facilities nationwide."[52] MCI WorldCom has "local phone facilities [that] cover nearly 90% of the local service areas in the U.S."[53] which enable the company to "bypass the RBOCs," and "save on both access and termination charges."[54] Sprint acknowledges that it has alternative facilities-based "access alternatives . . . including CLEC networks and fixed wireless."[55]

Communications Group, Inc. – Company Report at *15 (May 6, 1997) (estimating potential CLEC revenues for access and private line services at $14.7 billion, public switched services at $82.4 billion, and other enhanced services at $7 to $10 billion).

[50] *Bell Atlantic/NYNEX*, 12 FCC Rcd at 20029-30 ¶ 82.

[51] As the FCC has noted, "[O]nce CAPs are interconnected to the central offices that handle heavy traffic, they can gain a significant share of the access market by selling their services to the three largest IXCs." *Expanded Interconnection with Local Telephone Company Facilities*, Report and Order and Notice of Proposed Rulemaking, 6 FCC Rcd 7369, 7422 n.253 (1992); *see also Expanded Interconnection with Local Telephone Company Facilities*, Second Report and Order and Third Notice of Proposed Rulemaking, 8 FCC 7374, 7380 ¶ 15 (1993) ("Increased competition in the interstate special access market undoubtedly will result in some diversion of business from the LECs.").

[52] AT&T/TCG, *Merger Presentation*, Jan. 8, 1998, http://www.att.com/ir/ep.

[53] D. Pappalardo & D. Rhode, *Ebbers' Job Has Only Just Begun; Merging Worldcom, MCI Nets Will Prove Challenging*, Network World, Nov. 17, 1997 (*quoting* CEO John Sidgmore).

[54] D. Rohde, *Price: Buyout to Benefit Customers*, Network World, Nov. 17, 1997, at 11 (*quoting* Tim Price, MCI President and COO).

[55] Remarks by Sprint Chairman & CEO William T. Esrey at Internet World, July 15, 1998, http://www.sprint.com/Stemp/press/releases/9807/9807150597.html.