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Introduction

Understanding precisely how CLECs offer competitive services is made difficult by the lack of public data on network operations. To provide greater understanding in this area, CCG Consulting, Inc. of Riverdale, Maryland was retained to develop survey data on CLEC network operations in six markets: Albany, NY, Augusta, GA, Boston, MA, Chicago, IL, Corpus Christi, TX and Portland, OR. These cities were selected because they represented a fairly broad cross-section of populations, business concentrations and serving incumbents.

CCG collected data from as many network-based competitors as possible in each of these markets. To protect the confidentiality of each CLEC, survey data was collected and aggregated by CCG Consulting. Companies that agreed to participate in the survey (in one or more markets) include:

Allegiance Telecom
AT&T
Birch Telecom
Broadview Networks
Choice One Communications
Conversent Communications
Covad
Electric Lightwave
Eschelon Telecom
Focal Communications
Ionex Communications
KMC Telecom
MCI Metro
McLeodUSA
New Edge Networks
NewSouth Communications
PaeTec Communications
TDS Metrocom
WorldCom
XO Communications

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Although the survey does not include every provider in each market, we believe the sample to be sufficiently large to be representative of CLEC network operations in the market overall. For five of the markets we collected data for the entire MSA. In Boston, the MSA was so large that the CCG collected data for the area inside of Interstate 495. The number of CLEC Class 5 switches in each market is as follows:

	Albany	Augusta	Boston	Chicago	Corpus	Portland
Number of CLEC Switches[1]	5	1	17	15	1	7

The selection of the "market footprint" for analysis was made more difficult by the wide variation in the statistical areas (such as the MSA) defined by the Census Bureau, as well as the variation in the market focus of the individual CLECs. Although individual CLECs do not generally define their target market to match MSA boundaries, we worked with each CLEC to make sure that the data was compiled across the same footprint for each participant. This issue foreshadows a characteristic that is common to each of the following summaries: each market is unique, with different factors, geographies and competitive conditions influencing CLEC activity.

Although this summary of the data collected by CCG is intended to be presented in as a neutral a manner as possible, we are compelled to report one common finding: Competitive facilities development is not only modest (compared to the incumbent and the market), it is kaleidoscopic with no clear pattern that applies to all markets. What the data confirms is that emerging investment strategies of the competitive industry are nearly as diverse as the industry itself. While the majority of competitors in each market rely extensively on incumbent facilities, there is nearly always an exception to this rule. Such diversity is to be expected in a competitive environment, particularly one in which no single strategy has shown itself to be inherently superior to all others. With this overall conclusion in mind, the following summarizes the data we collected.

[1] None of the CLECs in any of these markets offer wholesale switching to any other CLECs.

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Leased Customer Access

The starting point for our survey focused on how CLECs are leasing loops to gain access to end-user customers. We asked each CLEC to identify and quantify the different sources for leased facilities to end-user premises. The results are presented in Table 1.

Table 1: Source of Leased Loop Facilities by Surveyed CLECs

	Albany	Augusta	Boston	Chicago	Corpus	Portland
CLECs in Study	4	3	11	10	4	8
Total Market Voice Access Lines	560,487	270,157	3,567,497	5,688,622	220,866	762,382
Voice Grade 2-Wire UNE Loop	27,380	2,472	57,433	82,446	1,715	9,976
DSL UNE Loop	851	74	12,145	37,248	258	3,837
T1 UNE Loop	13	208	1,375	5,073	255	533
Retail T1 from ILEC	162	92	5,972	10,833	7	1,601
Retail T1 from 3rd Party[2]	7	0	422	2,161	0	0
DS3 UNE Loop	3	0	56	5	6	1
Retail DS3 from ILEC	17	0	217	501	0	128
Total	28,433	2,846	77,620	138,267	2,241	16,076

Table I relies on the following definitions of each loop type:

- **CLECs in Study.** This is the total number of CLECs who provided data for each of the markets.
- **Total Market Voice Access Lines**. This is the combination of the RBOC and the CLEC voice access lines for the study area. RBOC access lines came from HAI Model: Release FCC, loop counts as of 10/99. CLEC access line counts are roughly from the first quarter of 2002 (slightly different months for various CLECs). We did not have reliable RBOC data loop counts by MSA so we used voice access lines in order to demonstrate the relative size of the total market. However, the lack of data access lines understates total access lines.
- **Voice Grade 2-Wire UNE Loops** are Unbundled Network Element loops purchased directly from the ILEC from an interconnection agreement. A CLEC must be collocated to be able to order a 2-wire UNE Loop.

[2] This category includes DS-1s where the billing entity differs from the ILEC, but where the DS1 facility itself may be provisioned using the ILEC network facility. Thus this category is the maximum *potential* number of DS1s obtained from 3rd parties in that market and may, or may not, indicate the emergence of a nascent market in that MSA.

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- **Digital Subscriber Line (DSL) UNE Loop** consists of a 2-wire clean copper DSL-capable loop. These quantities include DSL with and without line-sharing. Without line-sharing the CLEC gets a copper pair certified to have unimpeded signal to at least 12,000 feet. With line-sharing the CLEC gets the ability to offer DSL over a pair that is also providing ILEC voice service to the subscriber. These lines can be used to support a variety of types of DSL and the lines can often support data or voice. The use of these loops requires the collocation of DSLAMs, or DSL base stations.
- **T1 UNE Loop** consists of a 4-wire 1.544 Mbps capable unbundled loop purchased from an interconnection agreement. The CLEC must be collocated in order to utilize T1 UNE loops. The ILEC supplies these loops with T1 capable electronics.
- **T1 Retail Loop from the ILEC** consists of a 4-wire 1.544 Mbps retail circuit purchased from ILEC's retail tariff or access tariff. As a retail purchaser the CLEC is treated like any other ILEC customer in terms of product, price and term.
- **T1 Retail Loop from a 3rd Party** is a 4-wire 1.544 Mbps retail circuit purchased from a carrier other than the ILEC. The other providers in these particular markets are always interexchange carriers. None of the CLECs in these particular markets sell wholesale loops of any kind to other CLECs. We believe that the majority of these loops are ultimately served by and resold from the ILEC local network. Purchasing from a third party does not automatically equate to using an alternate network from the ILEC. In fact, we believe that the majority of these loops are really RBOC loops.
- **DS3 UNE Loop** is a UNE fiber loop cable of supporting a DS3 purchased from the ILEC from an interconnection agreement. These loops come with ILEC-provided electronics.
- **Retail DS3 from the ILEC** is a retail DS3 purchased from ILEC's retail tariff or access tariff. As a retail purchaser the CLEC is treated like any other ILEC customer in terms of product, price and term.

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Table 2: Relative Size of the Largest CLEC for each Loop Category

	Albany	Augusta	Boston	Chicago	Corpus	Portland
Voice Grade 2-Wire UNE Loop	85%	100%	50%	31%	100%	77%
DSL UNE Loop	100%	100%	84%	94%	96%	91%
T1 UNE Loop	100%	71%	81%	80%	100%	47%
Retail T1 from ILEC	62%	96%	33%	44%	100%	55%
Retail T1 from 3rd Party	100%	N/A	93%	99%	N/A	N/A
DS3 UNE Loop	100%	N/A	84%	100%	100%	100%
Retail DS3 from ILEC	100%	N/A	82%	62%	N/A	47%

CLECs vary significantly in the manner in which they conduct business and thus in the way that they use loops. Table 2 shows the relative size of the single largest CLEC in each market for each loop category. This table is driven from the loop numbers presented in Table 1 above. As an example, Table 2 shows that in Albany that one CLEC uses 85% of the 27,380 voice grade 2-wire UNE loops shown in Table 1. Since the business plans of CLECs vary so widely, the CLEC that uses the greatest number of one type of loop may not necessarily use loops of other types. Again, using Albany as an example, the CLEC who uses 85% of the voice grade 2-wire UNE loops may not be the same CLEC who uses 100% of the DSL UNE loops.

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On-Net Customer Access

In addition to relying on leased facilities, some CLECs have developed limited fiber networks that enable them to reach some buildings entirely over their own facilities. In our survey we define On-Net facilities to be those facilities where the CLEC owns both the physical loop and the electronics at both ends of the loop.

We have quantified CLEC On-Net opportunity by the number of buildings connected, the potential capacity of these systems and the number of T1 equivalents actually operating in Table 3. In addition, we have analyzed the geographic focus of CLEC facilities, which generally serve limited portions of each market (discussed below).

Table 3: On-Net Capability of Surveyed CLECs

	Albany	Augusta	Boston	Chicago	Corpus	Portland
Fiber CLECs/Total CLECs	1/4	1/3	4/11	5/10	1/4	4/8
Number of Connected Buildings	24	13	473	390	18	183
Buildings with Wholesale Loops	0	0	0	0	0	0
Buildings with Wholesale Dark Fiber	0	0	0	0	0	0
Number of Establishments in MSA	16,616	7,728	127,453	184,912	7,390	48,881
Number of Fiber Terminals	24	13	560	501	18	217
Fiber Terminal Capacity						
OC-48	0	0	224	236	1	47
OC-12	2	1	144	146	2	40
OC-3	22	12	192	118	15	130
Equivalent T1s Activated	85	66	4,332	4,394	125	551
Active T1s per Building	3.5	5.1	9.2	11.3	7.0	3.0

Following are the definitions of each line of the Table 3:

Fiber CLECs / Total CLECs. Fiber CLECs are those CLECs with at least one customer defined as an On-Net customer. On-Net is defined as a customer where the CLEC owns the loop and the electronics to reach the customer. All CLECs reported that On-Net customers in these markets were being served using fiber. Total CLECs are the total CLECs who participated in the survey for the given market.

Number of Connected Buildings represents the number of discrete street addresses with On-Net customers. These are often referred to as "lit" buildings. Note that lit buildings

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are lower than fiber terminals in markets where some buildings are served by multiple CLECs.

Buildings with Wholesale Loops. Of the connected buildings, these are the buildings where a CLEC offers wholesale loops to other CLECs. None of the CLECs in these markets offers wholesale loops to other CLECs.

Buildings with Wholesale Dark Fiber. Of the connected buildings, these are the buildings where a CLEC offers dark fiber to other CLECs. None of the CLECs in these markets offers dark fiber to other CLECs.

Number of Establishments represents the total number of businesses in the market. The source of the number is Census Bureau data of Business Establishments/MSA.

Fiber Terminal Capacity shows the quantity of various sizes of fiber terminals installed in the lit buildings. The CLECs all reported that very few of these facilities are fully equipped or are fully utilized. For example, a CLEC may have an OC-48 terminal in a building but only have it equipped with a few OC-3 cards.

Equivalent T1s Activated represents the active total equivalent T1s of service that are in place in lit buildings. We also show the number of equivalent T1s per lit building.

Location of On-Net Buildings

The On-Net locations tend to be in the downtown area where CLEC owned fiber networks are most likely to exist. As discussed below, nearly all On-Net buildings are located in very limited geographical sections and pockets in each MSA.

Albany

Of the 41 On-Net buildings in Albany, 37 are within the City limits. Of those, 32 are in the downtown area.

Augusta

In Augusta all of the On-Net buildings are downtown. Eleven of the thirteen lit buildings are on two city streets.

Boston

There are 473 lit buildings in Boston. Of these, 325, or 69% are located in the three exchanges serving the downtown area. The remaining buildings are scattered throughout the study area. However, there is a low density of lit buildings in suburban area and very

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few exchanges outside of the downtown area have more than 2 or 3 lit buildings in the entire exchange.

Chicago

Chicago has 390 lit buildings. 190 of these buildings are within the city limits. The majority of the remaining lit buildings are relatively close to major highways (i.e., Interstate 90, Interstate 84, Interstate 88 and Interstate 290.

Corpus Christi

There are 18 lit buildings in Corpus Christi. 12 of these buildings are clustered downtown.

Portland

The Portland MSA has 183 lit buildings. 132 of the buildings are within the city limits or Portland. The remaining On-Net buildings are clustered at various locations around the MSA. For example, there are 27 buildings clustered close together in Beaverton and 11 buildings clustered together in Vancouver, Washington.

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Network Connectivity

As indicated above, CLECs depend heavily on ILEC access to reach and serve customers. As shown in Table 4 below, CLECs facilities are predominately deployed in digital configurations.

Table 4: Comparing Analog and Digital Connectivity[3]

	Albany	Augusta	Boston	Chicago	Corpus	Portland	Overall
Analog Connectivity[4]	27,380	2,472	57,433	82,446	1,715	9,976	181,422
DS1 Connectivity	6,408	8,784	290,424	539,064	9,288	64,440	918,408
DS3 Connectivity	13,440	0	183,456	340,032	4,032	86,688	627,648
Percent Digital	42.0%	78.0%	89.2%	91.4%	88.6%	93.8%	89.5%

[3] The quantities in this table are Voice Grade Equivalents.

[4] CCG is aware that some analog loops are being used to provide xDSL services and, as such, should more properly be counted as a form of digital connectivity. CCG does not, however, have the data to identify the percentage of the purchased analog loops that have been configured to provide such service.