BOULT ▪ CUMMINGS
CONNERS ▪ BERRY PLC

Henry Walker
(615) 252-2363
Fax (615) 252-6363
Email hwalker@boultcummings com

January 16, 2004

Honorable Deborah Taylor Tate, Chairman
Tennessee Regulatory Authority
460 James Robertson Parkway
Nashville, TN 37243-0505

In Re: Implementation of the Federal Communications Commission's Triennial Review Order (Nine-month Proceeding) (Switching)
Docket No. 03-00491

Dear Chairman Tate:

Enclosed for filing is the original and 4 copies of the Direct Testimony, and 4 CD-ROMs with the exhibits, of the following witnesses on behalf of AT&T Communications of the South Central States, LLC:

- Jay M. Bradbury
- Steven E. Turner
- Mark Van de Water
- Don Wood

Also enclosed is a CD-ROM, which contains a complete copy of the testimony and exhibits of each witness and 4 copies of the videotape Exhibit MDV-14 to Direct Testimony of Mark Van de Water.

The testimony of Mark Van de Water contains confidential and proprietary information that should be held exempt from public disclosure. Pursuant to the terms of the protective agreement entered in this docket and confidential information under the Freedom of Information Act, 5 U.S.C. ⊙ 552(b)(4), a copy of the Confidential Testimony of Mark Van De Water is being filed under seal.

If you have any question, please contact me.

923443 v1
100071-030
1/16/2004

BEFORE THE TENNESSEE REGULATORY AUTHORITY

NASHVILLE, TENNESSEE

IN RE:

IMPLEMENTATION OF THE FEDERAL	**)**	
COMMUNICATIONS COMMISSION'S	**)**	**DOCKET NO.**
TRIENNIAL REVIEW ORDER – 9 MONTH	**)**	**03-00491**
PROCEEDING MASS MARKET SWITCHING	**)**	

DIRECT TESTIMONY OF JAY M. BRADBURY

ON BEHALF OF

AT&T COMMUNICATIONS OF THE SOUTH CENTRAL STATES, LLC

JANUARY 16, 2004

I. WITNESS QUALIFICATION AND INTRODUCTION

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND POSITION TITLE.

A. My name is Jay M. Bradbury. My business address is 1200 Peachtree Street, Suite 8100, Atlanta, Georgia 30309. I am employed by AT&T Corp. ("AT&T") as a District Manager in the Law and Government Affairs Organization.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND WORK EXPERIENCE IN THE TELECOMMUNICATIONS INDUSTRY.

A. I graduated with a Bachelor of Arts degree from The Citadel in 1966. I have taken additional undergraduate and graduate courses at the University of South Carolina and North Carolina State University in Business and Economics. I earned a Masters Certificate in Project Management from the Stevens Institute of Technology in 2000.

I have been employed in the telecommunications industry for more than thirty-three years with AT&T, including fourteen (14) years with AT&T's then-subsidiary, Southern Bell. I began my AT&T career in 1970 as a Chief Operator with Southern Bell's Operator Services Department in Raleigh, North Carolina. From 1972 through 1987, I held various positions within Southern Bell's (1972 – 1984) and AT&T's (1984 – 1987) Operator Services Departments, where I was responsible for the planning, engineering, implementation and administration of personnel, processes and network equipment used to provide local and toll operator services and directory assistance services in North Carolina, South Carolina, Kentucky, Tennessee and Mississippi. In 1987, I transferred to AT&T's External Affairs Department in Atlanta, Georgia, where I was responsible for managing AT&T's needs for access network interfaces with South Central Bell, including the resolution of operational performance, financial and policy issues.

From 1989 through November 1992, I was responsible for AT&T's relationships and contract negotiations with independent telephone companies within the South Central Bell States and Florida. From November 1992 through April 1993, I was a Regulatory Affairs Manager in the Law and Government Affairs Division. In that position, I was responsible for the analysis of industry proposals before regulatory bodies in the South Central states to determine their impact on AT&T's ability to meet its customers' needs with services that are competitively priced and profitable. In April 1993, I transferred to the Access Management Organization within AT&T's Network Services Division as a Manager – Access Provisioning and Maintenance, with responsibility for ongoing management of processes and structures in place with Southwestern Bell to assure that its access provisioning and maintenance performance met the needs of AT&T's strategic business units.

In August 1995, as a Manager in the Local Infrastructure and Access Management Organization, I became responsible for negotiating and implementing operational agreements with incumbent local exchange carriers needed to support AT&T's entry into the local telecommunications market. I was transferred to the Law and Government Affairs Organization in June 1998, with the same responsibilities. One of my most important objectives was to ensure that BellSouth provided AT&T with efficient and nondiscriminatory access to BellSouth's Operations Support Systems (OSS) throughout BellSouth's nine-state region to support AT&T's market entry.

Beginning in 2002 my activities expanded to provide continuing advice to AT&T decision makers concerning industry-wide OSS, network, and operations policy, implementation, and performance impacts to AT&T's business plans.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE REGULATORY COMMISSIONS?

A. Yes, I have testified on behalf of AT&T in numerous state public utility commission proceedings regarding various network and related issues, including arbitrations, performance measures proceedings, Section 271 proceedings, and quality of service proceedings, in all nine states in the BellSouth region. I also have testified on behalf of AT&T in proceedings before the FCC regarding BellSouth's applications to provide in-region interLATA long distance service.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The critical issue of this proceeding is not whether CLECs can "deploy" their own switches. Instead, the critical issue upon which this Authority should focus is whether a CLEC can "efficiently use" its own switch to connect to the local loops of end users. The differences in the way end users' loops are connected to carriers' switches are among the most important factors that cause CLECs to face substantial operational and economic entry barriers when they seek to offer Plain Old Telephone Service ("POTS") to mass-market (residential and small business) customers using their own switches and ILEC-provided loops (i.e., *via* unbundled network element-loop or "UNE-L" facilities-based entry). Until these barriers are removed, the FCC's finding of impairment cannot be overturned.

Accordingly my testimony:

- Compares the significantly different network architectures available to an ILEC and a CLEC when each wishes to use an ILEC-owned analog voice-grade loop, also referred to as a DSO loop, to connect a mass market customer with its respective switch in order to provide POTS; and

- Provides an overview of the network architecturally-based operational and economic entry barriers to successful UNE-L facilities-based entry and identifies CLEC witnesses who will provide more detailed testimony on the impact of those barriers and the fact that until the underlying local network architecture that has created these barriers is changed, CLECs will continue to face significant practical and economic impairments.

Q. DID THE FCC MAKE ANY FINDINGS IN THE TRIENNIAL REVIEW ORDER ("TRO") REGARDING THE ISSUES YOU DISCUSS?

A. Yes. The FCC found on a national basis that CLECs are impaired in serving the mass market in the absence of unbundled ILEC switching.[1] This finding was based on an analysis that began with the simple, self-evident proposition that CLECs cannot use their own switches, in lieu of the ILECs', unless they can connect their switches to their end-users' loops. The FCC explained:

> Competitive LECs can use their own switches to provide services only by gaining access to customers' loop facilities, which predominately, if not exclusively, are provided by the incumbent LEC. Although the record indicates that competitors can deploy duplicate switches capable of serving all customer classes, without the ability to combine those switches with customers' loops <u>in an economic manner</u>, competitors remain impaired in their ability to provide service. Accordingly, it is critical to consider competing carriers' ability to have customers' loops connected to their switches <u>in a reasonable and timely manner</u>.[2] (Emphasis added.)

To emphasize the importance of the ability of CLECs to connect their switches to the loops of their end-users, the FCC noted that no party disputed that competitors need access to the ILECs' loops to compete in the mass market.[3]

Starting from its basic premise that an <u>economic</u> connection between the local loop and a CLEC switch is a condition of non-impairment, the FCC noted the evidence in its record indicating the large disparity between the cost that CLECs incur to connect their end-users' loops to their own switches and the significantly lower cost that the

[1] TRO at ¶¶ 422, 459.

[2] TRO at ¶ 429 (emphasis added).

ILECs incur to do the same thing.[4] The evidence demonstrated that "even using the most efficient network architecture available for entry using the UNE-L strategy, [CLECs] are at a significant cost disadvantage vis-à-vis the incumbent in all areas."[5] The FCC relied on evidence of the CLECs' "cost of backhauling the voice circuit to their switch from the customer's end office" where his/her loop terminates, and noted that a significant cost disparity is created because the ILEC, whose switches are located where the customers' loops end, does not experience such costs.[6]

Indeed, the FCC was very specific about evidence of the additional costs faced by the CLECs. That CLECs must backhaul the circuit to their switches, *i.e.*, to extend the customer's loop beyond the point where it had connected to the ILECs switch, gives rise to "costs of collocating in the customer's serving wire center, installing equipment in the wire center in order to digitize, aggregate, and transmit the voice traffic, and paying the incumbent to transport the traffic to the competitor's switch," all costs that "put [CLECs] at a significant cost disadvantage to the incumbent."[7]

---

3 TRO at n. 1316.
4 TRO, at ¶¶ 479-481.

5 TRO at ¶ 479.

6 *Id*., at ¶ 479.

7 *Id*., at ¶ 480 (citations omitted).

Q HOW DO THESE DIFFERENCES IMPACT THE ABILITY OF CLECS TO SERVE CONSUMERS USING UNE-L GENERALLY OR FROM EXISTING ENTERPRISE SWITCHES IN PARTICULAR?

A. The difference in the way that ILECs and CLECs connect to the ILEC loops serving end-users lies at the heart of the impairment that CLECs sustain in trying to serve mass market customers without access to unbundled switching and unbundled network element-platform ("UNE-P"). The ILECs' advantage in the way they connect their switches to the loops of their end user customers derives from their historic monopoly position. The CLECs cannot replicate the advantages resulting from the ILEC's legacy network.

The difference in the manner and cost of connecting loops to switches between ILECs and CLECs affects mass market customers, the consumers expecting to benefit from competition, in particular. The significant cost of the CLEC having to backhaul the loop, even after that cost is spread across all mass market customers that a CLEC can possibly serve, cannot be overcome by a CLEC being smarter or more agile in the market or by cutting corners on internal costs. It simply is too large.

Indeed, as demonstrated in the testimony of Steven E. Turner, the cost of the backhaul structure that CLECs must incur and that ILECs do not incur amounts to more than the total ILEC TELRIC cost of providing switching in order to serve the customer. That is why it is less expensive for CLECs to pay ILECs for the cost of unbundled switching, instead of using capacity on their own switches currently serving enterprise customers, even when the capacity is currently spare. Indeed, so great are the backhaul costs per mass market customer that CLECs could not compete with ILECs if forced to backhaul their mass market voice circuits to their enterprise switches, even if there is spare capacity on those switches. That is why the Authority cannot rely on the presence of switches used to serve enterprise customers in an area as probative of whether CLECs can serve mass market customers without access to mass market switching.

The FCC found the failure of CLECs to utilize their existing enterprise switches to be probative evidence of significant barriers making entry uneconomic.

> We found significantly more probative the evidence that in areas where competitors have their own switches for other purposes (e.g., enterprise switches), they are not converting them to serve mass market customers and instead relying on unbundled loops combined with unbundled local circuit switching. Given the fixed costs already invested in these switches, competitors have every incentive to spread the costs over a broader base. Their failure to do so bolsters our finding that significant barriers caused by hot cuts and other factors make such entry uneconomic.[8]

> We find . . . that the fact that competitors have not converted unbundled loops combined with unbundled local switching or served residential customers with existing switches only serves to demonstrate the barriers to such service.[9]

Q. FROM A NETWORK ARCHITECTURE PERSPECTIVE WHAT IS THE FUNDAMENTAL OR CENTRAL PROBLEM UNDERLYING THE FCC'S FINDING OF IMPAIRMENT?

---

[8] TRO, at ¶ 447, fn.1365

[9] TRO, at ¶ 449, fn.1371 (citations omitted)

A. As discussed in detail below, the central problem is that the ILECs' legacy network architecture was designed to support a single regulated monopoly provider, not a competitive market with multiple service providers seeking access to the ILEC's loops. This architecture allows an ILEC to efficiently connect its legacy loops to its own switches within the ILEC's wire center to provide service to end user customers. However, the legacy ILEC network architecture provides an inefficient and uneconomic means for a CLEC that tries to connect those same loops to its switch that is always remotely located from the ILEC central office where these loops terminate. This fundamental structural difference creates overwhelming operational and economic advantages for the ILEC, advantages that make it both impractical and uneconomic for CLEC competitors to compete with the ILEC to serve mass market customers using an UNE-L architecture.

Q. WHAT ARE THE KEY COMPONENTS OF THIS STRUCTURAL DISADVANTAGE?

A. There are four key components to this structural disadvantage.

First, a CLEC must incur the time and cost to install and maintain a significant "backhaul" network infrastructure to connect its switch to the ILEC loops that terminate in the ILEC's wire center, which may also be referred to as a central office ("CO") or local serving office ("LSO"), while the ILEC has no such need for backhaul facilities. As the FCC explained in the TRO, "The need to backhaul the circuit derives from the use of a switch located in a location relatively far from the end user's premises, which effectively requires competitors to deploy much longer loops than the incumbent".[10] These CLEC backhaul costs include the non-recurring costs necessary to establish a collocation arrangement in every ILEC wire center in which the CLEC wishes to offer mass market services, the recurring costs paid to the ILEC for maintaining these collocation arrangements as well as the transport equipment and facilities necessary to extend the ILEC's loops to the remotely located CLEC switch.

Second, as the FCC found, a UNE-L CLEC must aggregate traffic from many locations in order to achieve the same switch economies of scale realized by an ILEC at a single location. This forces the CLEC to incur its backhaul cost disadvantage in many wire centers in order to achieve the type of switch scale economies that the ILEC achieves at a single wire center.

Third, the CLEC must pay exorbitant charges to the ILEC for transferring loops from the ILEC switch to a CLEC collocation facility, or from one CLEC to another. This transfer process also forces the CLEC's customers to suffer an inferior experience in converting to the CLEC's service compared with the treatment they can receive using UNE-P, or that interexchange carriers -- including the ILECs -- can offer customers using the Primary Interexchange Carrier ("PIC") change process for allowing customers to change their long distance service provider.

[10] TRO at ¶ 480 (citations omitted); see also TRO at ¶ 464, n. 1406, TRO, at ¶ 424, n. 1298 , and TRO at ¶ 429.

Finally, the CLEC is precluded from serving an entire segment of retail customers, those whose loops are currently served by integrated digital loop carrier (IDLC) systems, unless the ILEC has the spare non-IDLC loop plant in place to replace these customer's lines so that they are eligible for a UNE-L migration to a CLEC. This is described in more detail in Section V.

Because these significant economic and operational barriers are rooted in the ILECs' network design, a UNE-L market entry strategy to serve the mass market cannot be sustained unless there are significant modifications to the ILECs' existing network architecture.

Q. PLEASE DESCRIBE HOW THE REMAINDER OF YOUR TESTIMONY IS ORGANIZED.

A. Section II provides a historical overview of how the ILECs' networks developed and the principles underlying their evolution in a monopoly environment.

Section III describes how end-user locations are connected to ILEC switches and why that service configuration has serious implications for mass-market competition.

Section IV describes CLEC networks and how the incumbents' closed and integrated network architecture causes quantifiable and significant cost disadvantages for a new entrant.

Section V briefly describes the impairment created by the ILECs' increasing deployment of integrated digital loop carrier ("IDLC") technology and the impairment resulting from differences in call termination capabilities.

Section VI provides my concluding thoughts.

II. PRINCIPLES UNDERLYING THE HISTORICAL DEVELOPMENT OF ILEC NETWORKS

Q. CAN YOU PROVIDE AN OVERVIEW OF THE PRINCIPLES UNDERLYING THE HISTORICAL DEVELOPMENT OF ILEC NETWORKS?

A. Yes. The essence of the telephone network is *connecting* one party to another, whether they are physically located near each other or separated by considerable distance. There is value in merely being *able* to call any party on the network, or likewise being *able* to receive calls from any party on the network. In theory, the more parties that can be reached, the greater the value of the network. The nature of voice communication is that even brief conversations, such as emergency calls, can be of great value. Telephone networks are predominantly designed to facilitate relatively short, private, one-to-one, bilateral communications. The telephone network must stand ready to complete any particular call (or tens of millions of calls) at any time customers want to call, but stand partly idle when customers do not wish to use it.

Because of the high fixed cost required to maintain the ability to make direct connections between all customers and the relatively small proportion of time that those connections are required (coupled with the practical impossibility of directly connecting every customer to every other customer), the goal of an efficient telephone network is to balance the callers' ability to connect to any other customer with the cost of making the connection. This is accomplished by minimizing the proportion of assets dedicated to any particular customer and by creating "on-demand" connections whenever practical.

Q. HOW IS THE NEED FOR DEDICATED CONNECTIONS TO SERVE CUSTOMERS REDUCED?

A. Switching reduces the need for dedicated connections. In fact, a single switch in the ILEC's network permits any customer terminated on that switch to connect with any other customer terminating on that same switch without the need for any transport facilities. Depending on population density, these "intra-switch" calls can account for a very large percentage of all of the ILEC's traffic. By connecting switches to each other using efficient transport and tandem switching, all customers on those switches can connect with each other.

For example, assume that we wish to interconnect eight different customers for a two-way conversation between any two of the customers. (See Exhibit JMB- 1) If we count all of the transmission paths between any two of the eight customers, we find that a total of 28 such paths are required.

The maximum number of simultaneous connections that may exist, obviously, is four -- half of the subscribers talking to the other half. Furthermore, if a traffic study were made over a period of time, it would probably show that the occasions on which more than two links were in use would be quite rare. Clearly, maintaining 28 dedicated transmission paths is an inefficient arrangement.

Taking this example a step further, assume instead we have 1,000 customers that we wish to connect. It would be impossible to lay out the required 499,500 dedicated transmission paths necessary to allow these customers to communicate with each other. Thus, the central office was established as a point where all the transmission paths to the individual customers were terminated for switching. The original switches in these central offices were manual switchboards. All of today's switches are, of course, fully automated.

Q. BECAUSE A SINGLE SWITCH OBVIOUSLY CANNOT BE USED TO SERVE ALL CUSTOMERS, HOW DID THE INDUSTRY RESOLVE THIS PROBLEM?

A. Once central offices were established, two more questions rapidly came upon the industry: how many switches are needed to serve a given geographic area and how to connect customers in one switch to those in another?

The decision to invest in more switches was an economic trade off among: (1) the cost of an additional switch in a territory, (2) the cost of building long customer loops, or (3) deciding not to provide service, avoid the cost, and forego the additional revenue.

A typical copper loop without any enhancement can provide adequate telephone service out to a distance of about 18,000 feet (3.4 miles) from a switch. Thus in the early days of the industry, there were a lot of areas and customers without telephone service. Over time loop design and enhancement capabilities improved, making it possible, <u>at a cost</u>, to provide telephone service up to 160,000 feet (30.3 miles) from a switch, although such costly extreme loop lengths are rare. For decades, telephone companies extended service, grew and added switches by comparing the economics of long loops versus additional switches. In urbanized areas, bigger switches became located closer to the customers they served. In rural areas, with lower population densities, smaller switches with longer average loop lengths are more common.

Connecting all individual switches to each other with dedicated facilities may at first seem to create the same problem discussed above caused by connecting end-users with dedicated facilities; however, the connections between switches, known as "trunks" and "trunk groups" are much more efficient than loops. Loops are dedicated to individual customers; trunks, however, are used by multiple customers on an as needed basis. As a result, a key characteristic of trunks is that they carry "concentrated" traffic. Concentration, or over-subscription, is possible because it is unlikely that all potential users will want to make calls simultaneously. This permits the sharing of facilities by more users than could be accommodated if all users sought service at the same time. Concentration is limited by the level of service blockage probability that is deemed acceptable.

Trunk facilities are also less costly than individual loop facilities because trunks can be "multiplexed" – several trunks can be placed on the same facility. Multiplexing is the encoding and compacting of communications so that they take up less "space" on a communication facility. No blocking is introduced by multiplexing, although the degree to which the communications are compressed and the sophistication of the encoding may affect the ultimate service quality.

Further, "switching between switches", known as "tandem switching." can also be used, eliminating the need to build individual trunk groups from any one switch to all the other switches in the network until it is economical to do so. Such an individual trunk group would be built only when the volume of calling between any two switches warrants such a direct trunk group connection. By connecting one switch to another using efficient transport (including tandem switching), all customers of those switches can connect with each other.

Q. WHAT IS THE SITUATION TODAY RELATIVE TO LOOPS SERVING MASS MARKET CUSTOMERS?

A. The connection between a customer premises and the first point of switching – or the local loop – remains fundamentally a dedicated connection with little opportunity for cost sharing through multiplexing or concentration. The use of digital loop carrier (DLC), which only began to be deployed in the loop plant within the last two decades, provides some opportunity for cost sharing. Depending upon the type and vintage of the DLC, both multiplexing and concentration may occur. However, as I will discuss below, in Sections IV and V, the deployment of DLC in the loop plant creates additional sources of impairment. Loops were originally a simple copper cable pair between the customer's premise and the local switch, and for the mass market that remains prominently the case today, over 100 years later. The loop plant represents a high fixed cost infrastructure with little opportunity to share costs.

This is the very infrastructure the FCC found that incumbents must unbundle because competitors cannot duplicate or replace it. As the FCC explained:

> No party seriously asserts that competitive LECs are self-deploying copper loops to provide telecommunication services to the mass market.[11]
>
> When the incumbent LECs installed most of their loop plant, they had exclusive franchises and, as such, the record shows that they secured right-of-way at preferential terms and at minimal costs. By contrast, [the] record shows that new entrants have no such advantage.[12]

III. ILEC NETWORKS

[11] TRO at ¶ 226

Q. PLEASE DESCRIBE HOW LOOPS SERVING MASS MARKET CUSTOMERS ARE CONNECTED TO THE ILEC'S NETWORK.

A. In order to use an analog loop to provision traditional retail local voice service (*i.e.*, POTS), a local exchange carrier must connect that loop to a local circuit switch. The local loop is typically a copper transmission facility that originates at the customer's premise and terminates on a Main Distribution Frame ("MDF") in the incumbent LEC's wire center (see diagram at Exhibit JMB- 2).

When an ILEC provides POTS to a retail customer, the customer's loop must be connected to a port on the ILEC's switch. The switch port recognizes when a customer wishes to make a call (*i.e.*, goes "off-hook"), indicates to the customer that a call may be placed (*i.e.*, provides dial tone) and receives the dialed digits necessary to make the call. Similarly, the switch port notifies the customer when someone is calling (initiates ringing for incoming calls). For mass-market customers served by analog voice-grade loops, the switch port connection is generally accomplished using a "jumper" wire pair at the MDF in the ILEC central office. The MDF is a large metal framework that serves the simple purpose of terminating cable pairs in a manner that permits a cable pair on one side of the frame to be connected to a specific piece of central office equipment on the other side of the frame. (See Exhibit JMB-3.) In order to make the connection, an ILEC frame technician runs a pair of wires from one side of the frame to the other in order to make a continuous path between the customer's loop and the switch port.

[12] TRO at ¶ 238

Individual loops enter the ILEC central office as part of a large cable that collects many loops from a particular neighborhood. The cable typically runs through an underground cable vault and then into the building within a pre-designated infrastructure (cable ducts) to the MDF. The individual loops within the cable are then “fanned out” onto wiring blocks on the “customer facing” side of the MDF. Twisted pairs of insulated wire, commonly referred to as “jumper wires,” are used to cross-connect customer loops, which appear on the customer facing side of the MDF, to wiring blocks on the “network facing” side of the frame. The latter contain the wiring blocks onto which cables from the ILEC’s local switch ports are terminated. Using this technique, customer loops can be assigned to a specific analog switch port on the ILEC’s circuit switch by placing or repositioning the jumper wire on the MDF. Exhibit JMB-3 depicts a generic MDF cross-connect arrangement.

In order to provide POTS service, each customer’s individual loop must be connected to an assigned switch port. Currently, the vast majority of end-user loops are serviced by the ILEC, so the vast majority of end-user loops already terminate onto the ILEC’s circuit switch by way of the MDF. This is true whether or not service is currently active on the particular loop. When a customer terminates service, *e.g.*, when he or she moves from a location, the ILEC typically does not remove the jumper wires that connect that loop to the ILEC switch. Rather than disrupting the physical connection to the premises, the loop is typically placed in an “inactive” status by software commands issued to the switch’s software table. In such cases, no physical work is required to restore full service when a new customer requests it. Instead, the switch software table is merely updated through the use of keystrokes from a computer workstation to show the line is no longer "inactive." This practice of leaving the ILEC loop connected to the ILEC switch port is commonly known in the industry as "dedicated inside plant" and "dedicated outside plant". Other terms for this include "connect through" and "ready access".

Q. OBVIOUSLY THIS ASSOCIATION OF LOOPS AND SWITCH PORTS THROUGH THE USE OF FRAME CROSS CONNECTIONS OR JUMPERS REPRESENTS AN ECONOMIC AND EFFICIENT METHOD FOR THE ILEC; ARE THERE OTHER EFFICIENCIES IN THE ILEC NETWORK?

A. Yes. As discussed above, the evolution of the ILEC loop and switch architecture under monopoly protection has resulted in an effective and efficient arrangement in which both loop and switching costs have been optimized.

As a result of the volume of traffic and the resulting economies of scale that the ILEC enjoys, it is able to connect its switches for the completion of inter-switch calls for its customers by an efficient and economical inter-office transport network. The ILEC will engineer this network with direct switch-to-switch trunk groups in all cases where traffic volumes warrant such a connection. In cases where traffic volumes between two switches are not sufficient to justify a direct connection or in cases where there is overflow traffic that cannot be supported by the direct trunk group, the ILEC utilizes an efficient tandem switching and transport network to handle such traffic. This low cost network design allows the ILEC to complete its inter-switch calling using the minimum amount of trunk connections possible to complete a call between two switches. (See Exhibit JMB-4)

The ILECs were able to attain the necessary scale because, as the historic monopoly suppliers of all telecommunications services, they could count on serving the entire population located near their switches. ILECs were also able to attain switch scale economies through the use of "host – remote" switching arrangements. A moderate to large size switch in one wire center can "host" smaller "remote" switches (actually modules of the host switch) miles away in other wire centers Such remote switches are significantly less expensive than stand alone switches of the same line size. In sum, the ILECs efficiently use their ubiquitous legacy copper loop plant that employs relatively short loops and are able to maintain quality transmission for the analog signals carried over those loops. The ability to use short loops resulted from the monopoly franchise guarantee that there would be significant numbers of end-users within close proximity of a switch, such that the ILECs could attain the scale economies necessary to make their local switches economical.

CLECs, however, cannot benefit from the ILECs' ability to maximize the joint economies of *both* switching and loop facilities. Rather, as described below, CLECs must access the ILECs' loops where they terminate (i.e. in the ILEC's wire centers) and then do their best to survive in an environment in which they are subject to substantial costs and operational impediments not faced by the ILECs.

IV. CLEC NETWORKS

Q. HOW DO CLEC NETWORKS DIFFER FROM THE EFFICIENT AND ECONOMIC ILEC NETWORK YOU HAVE DESCRIBED?

A. In contrast to the incumbents, new entrants do not have the opportunity to achieve scale economies for their switches *and at the same time* minimize loop distances and costs by locating their switches where these loops terminate. The FCC summarized the problem as follows: "The [CLECs'] need to backhaul the circuit . . . effectively requires competitors to deploy much longer loops than the incumbent".[13] The FCC's rules do not permit a CLEC to place a circuit switch in a collocation.[14] And in all events, even if a new entrant were allowed to place a circuit switch in every local serving office, it could not achieve the same scale economies as the ILEC unless it possessed the same market share as the incumbent did in that particular office. This situation is, of course, a practical impossibility. Facing such market uncertainties, CLECs can at best expect to be able to serve only a fraction of the total end-users in any ILEC wire center.

Thus, CLECs must deploy individual switches to serve much larger areas than the ILEC, because that is the only way they could possibly achieve switching scale economies comparable to those enjoyed by the ILECs. The FCC recognized this problem in the TRO, noting that "[The RBOCs' cost studies] suggest that it would be

---

[13] TRO at ¶ 480

[14] 47 CFR 51.323 (ILEC may refuse to permit collocation of equipment not necessary for access to UNEs or interconnection).

uneconomic for a competing carrier to serve customers in smaller wire centers. All the studies found that in such wire centers, entry would be much more expensive for the competitive LEC than for the incumbent, or simply would be uneconomic"; and "[I]n smaller wire centers, where the competitors' customer base is likely to be smaller and they are unable to take advantage of scale economies, the cost disadvantage due to backhaul is much larger" .[15]

Accordingly, CLECs cannot use the same kind of connections, *i.e.*, the MDF jumper wire pairs used by ILECs, to link their customers' loops to their distant switches. Rather, CLECs must deploy an extensive *backhaul network* that extends the existing customer loops – all of which terminate at ILEC wire centers– to a distant CLEC switching location. In Tennessee, there are 195 BellSouth wire centers from which CLECs must "backhaul" end-user loops if they want to use their own switching to serve customers in all of the incumbent LECs' wire centers.

Q. WHAT MUST A CLEC DO IN ORDER TO "BACKHAUL" ITS CUSTOMER'S TRAFFIC TO ITS OWN SWITCH?

A. In order for a CLEC to "backhaul" its customers' traffic to its own switch, the CLEC must first create an overlay network infrastructure that is largely dedicated to the subset of customers won from the incumbent in a specific wire center. In essence, the CLEC must add a very long, costly and dedicated "extension cord" in order to connect its end-users' loops to its switches. This requires the CLEC to:

---

[15] *See* TRO at ¶ 484 *see also* TRO at ¶ 480 (citations omitted).

(1) establish and maintain collocations at ILEC wire centers, where customers' loops are "collected;"

(2) install and maintain the equipment necessary to digitize and, using concentration and multiplexing techniques, aggregate the traffic on those loops to permit connections to the CLEC's switch at acceptable quality levels; and

(3) establish the necessary transport facilities that provide the physical path connecting the CLEC's collocations and its switch.

Only after all of this infrastructure and these functionalities are in place and operational in each ILEC wire center in which it wishes to compete can a switch-based CLEC begin to offer service to customers in those incumbent's wire centers. Thereafter, for each individual customer line it seeks to serve, the CLEC must then arrange and pay for a manual, volume limited, and costly "hot cut" process to have the customer's loop connection transferred to its collocation, and the customer's telephone number ported to the CLEC's switch.

In sum, due to the underlying integrated, and effectively closed, design of the incumbents' local network architecture, competitors must invest in and deploy all of the functionalities described above in order to replace a simple jumper pair across the incumbent's MDF. That is why the FCC correctly found that the barriers CLECs face in attempting to provide a UNE-L based service

> are *directly associated with incumbent LECs' historical local monopoly*, and thus go beyond the burdens usually associated with competitive entry. Specifically, the ***incumbent LECs' networks were designed for use in a single carrier, non-competitive environment*** and, as a result, the incumbent LEC connection between most voice-grade loops and the incumbent LEC switch consists of a pair of wires that is generally only a few feet long and hardwired to the incumbent LEC switch.[16] (Emphasis added)

These barriers generate very significant costs for the CLECs, costs that ILECs do not incur. This, in turn, makes it impractical and uneconomic even for "efficient" competitors to provide service *via* UNE-L to the low volume (and low margin[17]) communications users typically found in the mass-market.

The following subsections describe in greater detail the general infrastructure and equipment that a CLEC must install and operate in order to provide service to mass market customers using analog voice grade loops (*i.e.*, collocation, collocation equipment, transport, and hot-cuts).

A. Collocation

Q. WHAT IS THE FUNCTION OF A COLLOCATION AND WHY ARE THEY PROBLEMATIC?

[16] TRO at ¶ 465 (emphasis added) (citations omitted).

[17] TRO at ¶ 474 (the mass market is "characterized by low margins").

A. A CLEC cannot provide any telecommunications service employing a UNE-L architecture until the retail customer is physically connected to its network switch. In order to provide POTS service, as explained above, a CLEC must deploy the equipment required to digitize, encode, multiplex and concentrate its customers' traffic so that the unbundled loops terminating in the ILEC's wire center can be extended to the CLEC's switch. In order to do so, *i.e.*, to make an ILEC loop useable at a CLEC switch, the CLEC must rent space to establish a collocation in the ILEC's wire center. (See Exhibit JMB-5)

Establishing a collocation involves a number of activities and costs that will vary depending on the type of collocation established. The ILECs offer various collocation arrangements including physical collocation in which the CLECs equipment can either be secured in a "caged" space or unsecured in a "cageless": space and virtual collocation in which the CLEC's equipment is leased to the ILEC and is installed and maintained by the ILEC on the CLEC's behalf.

In general, the activities required to establish a collocation include: (1) obtaining the necessary space in the wire center, which is predicated upon the ILEC having sufficient collocation space in its central office;[18] (2) engineering the collocation; (3) arranging construction (for physical caged collocations); (4) cabling the CLEC interface frames for its collocated equipment to cross-connection frames in the incumbent's space and (5) installing the required equipment in the collocated space.

Because the CLEC's equipment in the collocated space requires electric power, the CLEC must also pay the incumbent for delivery of direct current ("DC") power and emergency power to operate the collocated equipment. In some instances, the CLEC may opt to invest in additional equipment to deploy power distribution, i.e., a battery distribution fuse bay ("BDFB") within its own collocation to provide for more flexibility and to minimize the need for a subsequent (and generally very costly) power augment. In general terms, the collocation power charges are driven by the charges for redundant power feeds (sized for the maximum demand in the collocation) and the necessary HVAC for the collocated equipment.

A CLEC's collocation costs can be highly influenced by the incumbent's minimum requirements for collocation purchases. For example, while a CLEC may only require 25 square feet of floor space for its equipment in a given LSO, the ILEC may have a minimum size for caged collocation of 50 or 100 square feet. Similarly, while the CLEC's equipment may only require 40 amps of power the ILEC may have a minimum power feed requirement of 60 DC amps and/or the power may be billed based on fused rather than drawn power. In Tennessee, a recent ruling by this Authority now requires that ILECs bill CLECs for power based on the power actually used rather than by fused amps.

Such minimum space/power requirements serve to needlessly inflate a CLEC's collocation expenses, particularly for locations where the CLEC may only win a small quantity of lines. Accordingly, the average cost of collocation under such

[18] *See* TRO, at ¶ 477

conditions may become prohibitive, because the equipment deployed actually requires substantially less space and/or power than the minimum space required or power charged for by the ILEC. Similarly, the incumbent sometimes applies large up-front one-time charges for the collocation application, cage engineering (whether for space or power) or administrative fees (such as project management, space availability reports, etc.), which may prove unrecoverable depending upon the market share achieved in the specific area served by the collocation facility.

As discussed in the testimony of Steven E. Turner, the unit collocation costs for an efficient CLEC seeking to serve the mass market in Tennessee are significant.

B. Collocation Electronics

Q. CAN YOU DESCRIBE THE KEY ELECTRONIC COMPONENTS NECESSARY?

A. Yes. Obviously having an empty collocation space does not by itself provide the CLEC with any of the functionality necessary to connect customers on ILEC loops to the CLEC's switch. Additional equipment is necessary to make the loop connection work. (See Exhibit JMB-6) For example, analog voice signals degrade and unwanted noise increases as the length of a copper facility increases. Thus, the longer a copper loop, the less a voice signal can be distinguished from noise on the line. This is known as "signal loss". The incumbent's loop plant is designed so that voice grade loops consume all but a "safety margin" of the allowable signal loss on the conductor. Therefore, once the analog loop is delivered to the CLEC collocation cage, the analog telecommunication signals on the loop cannot travel much farther and still retain acceptable voice and analog modem quality levels.

Accordingly, in order for a CLEC's mass-market customers' communications to transit back and forth between the customer's premises and the CLEC's remotely located switch at an acceptable level of quality, the CLEC must install digital loop carrier ("DLC") transmission equipment. While this DLC equipment is absolutely mandatory for the CLEC, it is not required for the ILEC when serving the same customers.

The CLEC's DLC equipment must be placed in the collocation arrangement that is located in the wire center where the end-user loops terminate. The equipment digitizes, encodes, concentrates and multiplexes the analog signals received from the customer so that the CLEC can extend the loop signal back to its remote switch in a manner that (1) provides service quality that will meet customer expectations and (2) minimizes the CLEC's costs to transport its customers' traffic back and forth from its switch. This equipment includes the cross-connection frame (also known as a POTS bay) between the incumbent's MDF where the loops terminate and the DLC equipment, the DLC equipment itself, and high capacity digital cross-connection frames ("DSX-1" or "DSX-3") necessary to cross-connect the digital output from the DLC to the transmission facilities that ultimately connect to the CLEC's remotely located switch. In addition, test access and monitoring equipment must be deployed in the collocation to allow the CLEC to operate its equipment as efficiently as possible.

As noted above, the CLEC DLC equipment, which is not required in the ILEC's network, receives the analog communications from the loop and digitizes, concentrates and multiplexes the communications on the CLEC customers' loops so that the connecting transport facility can be used efficiently. The DLC also interoperates with the CLEC's switch to provide and receive the signaling necessary for call supervision, including the provision of dial tone and ringing current, digit reception and related functions. Thus, when using this architecture arrangement, the DLC equipment is not only needed to extend the CLEC's loops, it is also essential to provide electrical current for the ringing and dial-tone necessary for POTS service, functions that are performed by the ILEC's switch port as described in Section III above.

Additional equipment is needed to take the output of the DLC and place it on transport facilities for transmission out of the retail customer's wire center. The digital cross connection frame (or DSX equipment) provides for this functionality by permitting the DLC to be efficiently cross-connected to the backhaul transport facility. DSX-1 equipment allows for connections to DS-1 transport facilities. DSX-3 equipment allows for connections at the DS-3 level. The volume of traffic that will be served from the wire center dictates the type of equipment used at a particular location. As described in greater detail in the Transport section below, when transport is leased from the incumbent, the DSX equipment cross-connects DLC transmissions from the CLEC's collocation to the ILEC's transport facilities. In cases where the CLEC provides its own transport to its switches, connections from the DLC are typically to an optical multiplexer which, in turn, is connected to the CLEC's metropolitan fiber ring. (See Exhibit JMB-7)

Q. CAN DLC EQUIPMENT AND DSX EQUIPMENT BE INSTALLED IN A MANNER THAT GROWS SMOOTHLY WITH THE GROWTH OF CLEC CUSTOMERS IN AN AREA SERVED FROM A COLLOCATION?

A. No. DLC equipment is not designed to, and therefore cannot, scale precisely with the level of demand (or number of lines) served in a wire center. Rather, there is a minimum amount of DLC equipment that must be purchased and installed. Accordingly, DLC investment is very "lumpy". The first module of collocated DLC typically includes equipment that manages the interface with both the transmission facility and the sub-modules of DLC equipment where the lines physically terminate.

For example, common equipment in the LiteSpan 2000 product, manufactured by Alcatel, can serve up to 2,016 POTS lines. Additional equipment, which is frequently referred to as a channel bank assembly, manages the interface between the analog lines and the digital switch port and provides for the sharing (concentration of lines) of the transmission facility. The channel bank assembly for the LiteSpan 2000 product handles up to 224 POTS lines. Finally, individual POTS lines terminate on electronic devices called line cards. Line cards terminate the loop and provide the electrical interface to the DLC channel bank assembly. For the LiteSpan 2000 product, 4 POTS lines can terminate on a single line card. In the LiteSpan example, in order to serve a single POTS line, a CLEC would need one line card capable of serving up to four lines, one channel bank assembly capable of serving up to 224 lines and one DLC common unit capable of serving up to 2,016 lines. No additional investment would be needed until the fifth line is served, when a second line card would be required. A new channel bank would be required when the 225th line is added, and when the 10th channel bank assembly is required (*i.e.*, when the 2,017th line is added) the whole process would start again with new common unit, a new channel bank assembly and a new line card.

Additionally, because the many collocated DLCs that subtend a CLEC's switch are so widely dispersed over a large geographic area, it is uneconomic to incur the travel expense to add small increments of equipment. Accordingly, CLECs are forced in practice to install extra capacity rather than dispatch a technician each time a new line card or channel bank assembly is needed. Thus, the CLEC must install an inordinate amount of spare equipment and suffer a sub-optimal equipment utilization rate.

The digital cross connection frame (whether a DSX-1 or DSX-3) takes the output of the DLC as a digital electrical signal and connects it to either a DS1 or a DS3 transport facility that extends the loops from the CLEC's collocation to the CLEC switch. DSX equipment is also not designed to scale smoothly with growth. A typical DSX 3 panel can terminate 24 DS-3 transport circuits. Each DS-3 is equivalent to 672 DS-0 (voice grade) channels, and DLCs typically permit 4 lines to share a single channel through the unit's concentration capabilities. A single DSX-3 panel when used in conjunction with DLCs, therefore, has capacity to handle more than 64,000 (24 x 672 x 4 = 64,512) POTS lines – approximately the equivalent capacity of a large incumbent LEC wire center.

C. Transport

Q. PLEASE DESCRIBE HOW THE TRANSPORT FUNCTION IS ACCOMPLISHED.

A. What I have described so far brings the loop into the collocation space and prepares it to be extended, along with numerous other loops, to the CLEC's distant switch. Once a CLEC customers' signals have been prepared for transport to the CLEC switch, the CLEC must arrange for transmission capability to deliver traffic from the collocation to its remotely located switch. Here again, this transport requirement does not exist in the ILEC's network.

In some cases, a CLEC's collocation will be connected to another collocation through the purchase of ILEC transport facilities (*e.g.*, DS1 and DS3 capacity facilities) as the CLEC traffic volumes at most incumbent wire centers are typically too low to justify CLEC construction and use of owned transport facilities. (See Exhibit JMB-8) When used, this second CLEC collocation typically serves as a "hub" location to aggregate loops from several sub-tending collocations in the area and subsequently transport the loops to the CLEC's switching location, either over higher capacity leased facilities or using self-provided CLEC transport. The FCC commented on this type of arrangement in the TRO: "Competing carriers generally use interoffice transport as a means to aggregate end-user traffic to achieve economies of scale. They do so by using dedicated transport to carry traffic from their end users' loops, often terminating at incumbent LEC central offices, through other central offices to a point of aggregation." [19]

Self-provided transport between ILEC wire centers is the exception rather than the rule for mass-market service. Indeed, POTS volumes from a single wire center alone could not justify a CLEC's deployment of its own transmission facility. This is corroborated by the FCC's finding of national impairment when a CLEC requires 12 or fewer DS3s of capacity. [20] Twelve DS3s are equivalent to 32,256 POTS lines, with a four-to-one DLC concentration ratio. However, the average sized ILEC wire center has under 15,000 POTS lines.

In other cases, rather then linking two collocations together, single collocations will be equipped to extend the loops collected directly to the CLEC's switch location. (See Exhibit JMB-5.)

In either case, regardless of which carrier provides it, a CLEC must procure transport facilities between its collocations and switching locations in order to backhaul

[19] *See* TRO at ¶ 361. *See also* TRO at ¶ 370.

[20] TRO at ¶ 388.

customers' loops to its switch. Ironically, when the transmission capability is procured from the ILEC rather than self-provisioned, the CLEC's transport cost has potentially increased as a result of the TRO. In the TRO, the FCC determined for the first time that ILECs are no longer required to unbundle transport facilities for requesting CLECs when such facilities are used to backhaul traffic from the CLEC end user loops to their switches.[21] As a result, CLECs may now be required to pay above cost special access rates to ILECs for such transport.

D. Physical Transfer Of Loops

Q. ONCE THE CLEC HAS PURCHASED, INSTALLED AND ACTIVATED ALL OF THE COLLOCATION SPACE, EQUIPMENT ELEMENTS AND TRANSPORT ARRANGEMENTS, WHAT ELSE MUST OCCUR FOR CLECS TO PROVIDE SERVICE TO CUSTOMERS USING UNE-L LOOPS?

A. Once the necessary network infrastructure described above is in place, the CLEC is finally in a position to transfer individual customer loops from the incumbent's network to its collocation and ultimately to its switch. In order to accomplish this, the CLEC must arrange for what is typically referred to as a hot cut. The hot-cut process, which is described in detail in the testimony of Mark Van de Water, involves multiple manual steps and coordinated activities of both CLEC and ILEC personnel.

These include, among other things: (1) interrupting the customer's service while changing the customer's loop cross-connection at the MDF from a terminal pair

[21] TRO, at ¶¶ 365-369.

connected to the incumbent's switch port to a terminal pair that connects to a pair of terminals in the CLEC collocation and (2) coordinating the porting of the customer's telephone number to the CLEC's switch so that calls dialed to the customer's number can be properly completed. Once the hot-cut has been successfully completed, a CLEC can finally provide service to its end-user using its own switch. In contrast, as discussed above, the ILEC can provide service to that same customer on the same loop through a software change command. Because of all of the physical work and manual touch points and the associated human error involved with a hot cut, the process is inadequate to service mass market customers.

As the FCC noted, the shortcomings of the hot cut process also stem from the ILECs legacy network created for a monopoly environment:

> The barriers associated with the manual hot cut process are directly associated with incumbent LECs' historical local monopoly, and thus go beyond the burdens usually associated with competitive entry. Specifically, the incumbent LECs' networks were designed for use in a single carrier, non-competitive environment and, as a result, the incumbent LEC connection between most voice-grade loops and the incumbent LEC switch consists of a pair of wires that is generally only a few feet long and hardwired to the incumbent LEC switch. Accordingly, for the incumbent, connecting or disconnecting a customer is generally merely a matter of a software change. In contrast, a competitive carrier must overcome the operational and economic barriers associated with manual hot cuts. Our finding concerning operational and economic barriers associated with loop access reflects these significant differences between how the incumbent LEC provides service and how competitive LECs provide service using their own or third-party switches.[22]

E. Issues of Scale

Q. DO ALL OF THE ADDITIONAL SPACE, EQUIPMENT AND FACILITIES YOU HAVE BEEN DESCRIBING THAT ARE NOT REQUIRED IN THE

[22] TRO at ¶ 465 (citations omitted).

ILEC'S NETWORK ADD SIGNIFICANT COSTS TO THE CLEC NETWORK?

A. Yes. Each of the collocation and backhaul costs that a CLEC must incur to connect a customer's ILEC loop to the CLEC's remote switch is a cost that the ILEC does not incur to serve the same customer, because the ILEC's switch is located in the same wire center where its customers' loops terminate. The CLEC's cost disadvantage, however, is multiplied because the ILEC also significantly benefits from what economists might describe as "first mover advantages" that translate into scale advantages.

Because of its status as the incumbent, monopoly provider, the ILEC starts with all the customers in a wire center, and each of them are already served by its switch and generating revenue. Thus, the ILEC does not have to expend resources attempting to persuade customers to change carriers in order to acquire their business and revenues. Unlike competitive carriers, the ILEC does not need to "acquire" large numbers of customers. It only needs to hold its existing customers while offering attractive win-back offers to entice customers who left for a competitor to return.

These scale or share disadvantages multiply the backhaul cost disadvantage described above. Switches are expensive, fixed cost investments and are thus subject to substantial economies of scale. Put simply, switches must be filled with the lines and traffic of paying customers in order to generate the revenues needed to recover the cost of these high fixed-cost investments. However, in order for a CLEC to achieve the same switch scale economies that an ILEC achieves for a single switch at a single wire center, that CLEC must aggregate substantial quantities of loops from multiple central offices and bring the traffic from each of them back to its own switch. To do so, it must build and pay for multiple collocation and "backhaul" arrangements in order to achieve the same scale efficiencies that the ILEC achieves at a single location.

For example, assume an ILEC has 40,000 mass market voice grade lines terminating in its wire center and a switch in that wire center with the capacity to handle the quantity of traffic generated by these lines. Assume, also, the ILEC will likely retain 80% of the customer lines while the CLEC community splits the remaining 20%. If a CLEC expected to serve 10% of the lines out of that wire center (or 50% of the aggregate CLEC market share), the CLEC would expect to serve 4,000 customer lines out of the wire center while the ILEC would have the traffic and revenues from 32,000 lines to fill its switch and recover its costs.

In order for the CLEC to achieve the same 32,000 mass market lines on its (distantly located) switch, it would have to aggregate a similar percentage of the analog lines from approximately 8 ILEC central offices of equal size. (Alternatively, the CLEC would have to fill its switch by accessing loops from a larger number of smaller ILEC wire centers resulting in further increased backhaul costs.) To achieve this degree of switch usage (32,000 lines), the CLEC would need to have 8 collocations and 8 backhaul arrangements, all just to have the same switch scale economies as the ILEC in one single wire center.

Exhibit JMB-9 provides an overview of the CLEC network architecture required to collect and extend customer's loops from the ILEC wire center to the CLEC switch. The contrast with what is required for the ILEC to perform the same function, shown in Exhibits JMB-2 and JMB-3, cross connect a loop to a switch port using a jumper on the MDF, is clear.

V. IMPACT OF ENHANCED LOOP TECHNOLOGY DEPLOYMENT AND CALL TERMINATION

Q. ARE THERE ADDITIONAL IMPAIRMENTS THAT RESULT FROM THE ILECS DEPLOYMENT OF ENHANCED LOOP TECHNOLOGY?

A. Yes. CLECs are further impaired in offering service to mass market customers because the incumbent has placed a large and growing portion of these customers' loops on integrated DLC ("IDLC") equipment. As described in the testimony of Mark Van de Water, IDLC loop arrangements, where alternative spare capacity is not available, can practically foreclose CLEC access to the retail customer.

Increased deployment of IDLC can significantly limit CLECs' ability to provide competing service if they are denied access to UNE-P. This is so because the IDLC equipment multiplexes multiple customers' traffic onto a single loop "feeder" facility that feeds directly into the ILEC's switch, and there is no simple way to segregate (or access) the traffic of a particular customer served with an IDLC loop. As a result, additional steps must be taken to segregate and access the traffic of a customer that desires to take service from a CLEC.

The steps required are dependent upon a number of factors within the LEC's control, including the accuracy of its records (as to which loops are served by IDLC) and the existence of spare loop plant of the appropriate type in the ILEC's network that would allow a competitor to provide a comparable level of service to the ILEC's service. For example, if the ILEC's database does not reveal the presence of IDLC before a conversion date is committed to the customer, the CLEC must negotiate a new date with that customer, which of course makes a negative impression.

Where the presence of IDLC is identified before the confirmation of the conversion date, the customer must be transferred to alternative facilities, provided such facilities are available and provided acceptable service quality is possible. But even then, the process to transfer the customer will require a field dispatch to the remote end of the IDLC facility so that the customer's loop may be re-wired to spare copper or UDLC facilities. In cases where acceptable spare loop plant is not available, other customers who are not otherwise involved in the hot cut may be affected. In these cases the ILEC might "swap-out" a retail customer's non-IDLC loop facilities with the IDLC facilities of the customer who wishes to change his/her local service provider. Overall, the process to accommodate access to IDLC loops is resource intensive, costly, customer affecting and difficult to coordinate, even when compared to the "ordinary" hot cut process. Additionally, as competition increases, the CLECs may find situations where the ILEC has neither spare facilities nor retail customers with non-IDLC facilities that can be used for a swap-out. In these cases the CLEC will be precluded from offering a competitive choice to these customers.

Additionally, except when the IDLC served customer can be placed on a copper loop less than 18,000 feet in length, CLECs are denied the capability of providing DSL services to their customers. In contrast, BellSouth can provide its retail DSL service, known as FastAccess, to the vast majority of its customers in Tennessee despite loop lengths that preclude CLEC DSL service. While I do not have data specific to Tennessee, I know that in Florida and Georgia FastAccess is available to over 86% of BellSouth's customers.

Q. IN SECTION III ABOVE YOU DISCUSSED THE EFFICIENT AND ECONOMIC NETWORK AVAILABLE TO ILECS, AND CLECS USING UNE-P, TO TERMINATE CALLS. DO CLECS FORCED TO USE UNE-L HAVE ACCESS TO THE SAME EFFICIENCIES AND ECONOMIES?

A. No. CLECs will also be impaired when trying to serve the mass market with unbundled loops by an inability to exchange traffic with the ILEC at a switch-to-switch level. As explained earlier, because the CLEC does not have the economies of scale to direct connect its switch with efficient inter-office trunk groups to each of the ILEC's local switches, the CLEC will be more reliant on the ILEC's tandem network for the exchange of traffic. This reliance will put the CLECs at a cost disadvantage because of the additional tandem switching costs and transport facilities that will be needed to complete each of its calls. Additionally, because the CLEC will route a large percentage of its traffic to the ILEC's tandem switch it will face the potential for greater call blocking as a result of tandem congestion and/or inadequate subtending trunking from the ILEC's tandems to its end offices. (See Exhibit JMB-10)

VI. CONCLUSION

Q. HOW HAS THE MONOPOLISTIC HISTORY OF THE ILEC IMPACTED THE EVOLUTION OF THE LOCAL NETWORK OVER THE LONG RUN AND IN THE YEARS SINCE THE PASSAGE OF THE TELECOMMUNICATIONS ACT OF 1996 ("the ACT")?

A. Incumbent LEC networks were designed in a manner that enables them -- and no one else -- to maximize the efficiencies of both their loop and switching assets. This design provides them with substantially higher quality and lower costs compared to their potential competitors. Specifically, ILECs can connect their analog voice grade loops to their switches by using a simple jumper wire pair across the MDF in the customer's local serving office. ILECs were able to construct this type of network architecture because, as the historic monopolists, they supplied local telecommunications to all customers in their serving areas.

Until the passage of the Act in 1996, the network evolved for the exclusive use of a single user, the ILEC. Since the passage of the Act, the ILECs have resisted opening that network for use by their competitors, doing so only when and as specifically ordered by the FCC and various states.

Q. BECAUSE OF THE SINGLE USER NATURE OF THE ILEC'S NETWORK, WHAT ARE THE BARRIERS FACING CLECS WANTING TO USE THE LOOPS IN THAT NETWORK TO PROVIDE LOCAL SERVICE USING THEIR OWN SWITCHES?

A. CLECs cannot maximize the combined efficiencies of both the ILEC loop plant and their own network infrastructure. Rather, in order to compete, they must take the ILEC loop plant as it exists and extend all of their customers' loops to their own switches, which are typically located a significant distance from the customer's serving office, a network architecture that is expensive and necessary. Accordingly, before a CLEC can provide POTS service using its own switch and ILEC analog voice grade loops, it must:

(1) engineer, establish and maintain a collocation, including the associated HVAC and power;

(2) install and maintain digitization, concentration, and multiplexing equipment at its collocations, as well as related monitoring/testing and power distribution equipment; and

(3) arrange for and provide transport between its collocation and its switch.

Each of these activities imposes additional costs and operational barriers on CLECs, costs that ILECs do not incur to offer the same service. As noted above and demonstrated in the testimony of Steven E. Turner, the additional cost per line in

Tennessee that such activities impose on CLECs represents significant, real costs not faced by incumbents that effectively foreclose CLECs from serving mass-market customers through the use of their own switches.

Q. GIVEN THE SIGNIFICANT BARRIERS FACING CLECS DESIRING TO ENTER THE LOCAL MARKET USING UNE-L, HOW HAS COMPETITION FOR MASS MARKET CUSTOMERS ACTUALLY DEVELOPED IN THE SEVEN YEARS SINCE THE PASSAGE OF THE ACT?

A. A number of CLECs did attempt to enter the market using UNE-L. Most are now in bankruptcy, and those who are not serve only business customers. A number of other CLECs attempted to enter the market using total services resale ("TSR"). TSR quickly proved to be financially untenable except as a niche product to serve groups of customers on a pre-paid basis that could not otherwise obtain local service.

After a delayed start, caused by ILEC regulatory opposition at the state level, UNE-P has emerged as the entry method capable of and actually bringing competition to the mass market. As Mr. Joseph Gillan notes in his testimony for CompSouth, UNE-P works, and furthermore, benefits not only CLECs, but also the ILECs, and most importantly, the consumer, when compared to forced use of UNE-L.

UNE-P is an electronic service provisioning system that extends to the CLECs many of the same efficiencies and economies available in the ILEC network. UNE-L is not and cannot be made so through the implementation of "batch" hot cut processes and a pairing with "rolling access" neither of which, individually or collectively, eliminates any of the fundamental characteristics of the existing single user ILEC network.

Q. CAN THE FUNDAMENTAL CHARACTERISTICS OF THE EXISTING SINGLE USE ILEC NETWORK BE MITIGATED WITHOUT TECHNOLOGICAL CHANGE?

A. No. Until the underlying local network architecture that has created these impairments is changed, CLECs will continue to face significant practical and economic impairments in serving mass market end-users on ILEC loops *via* their own switches—impairments that make UNE-P the only viable entry method for serving the mass market.

Q. CAN THE FUNDAMENTAL CHARACTERISTICS OF ACCESS TO LOOPS BE CHANGED IN A MANNER THAT BENEFITS CONSUMERS BY EXPANDING THE DEVELOPMENT OF MASS MARKET COMPETITION?

A. Yes. There is a means available that uses currently available technology and allows the provisioning of loops to be operationally and competitively neutral, making it the local service counterpart of "equal access" in the long distance market. This is a process that AT&T has generically referred to as "electronic loop provisioning" ("ELP"). Exhibit MDV-4, attached to the testimony of Mark Van de Water, is a videotape that concludes with an overview and demonstration of ELP and is directly related to my testimony here.

As discussed in Section IV above, the underlying single user local network architecture and technology that ILECs deployed over the decades, and have resisted changing since the passage of the Act, impose on CLECs the burdens of a vast investment in backhaul infrastructure (e.g., collocation, collocation electronics, and transport facilities) and of an inefficient and costly loop migration process (*e.g.*, hot cuts) that ILECs do not have to incur in order to serve end-users. The "batch" hot cut process and use of UNE-P based "rolling access" do not erase any of these problems that make the use of UNE-L for the mass market infeasible. Change is required and possible and, in fact, many of the components necessary to make the change are already in use in the ILEC network.

Competitively neutral, efficient access to customer loops is required for mass-market competition to develop and be sustainable in a UNE-L environment. This means that customer transfers among competing networks must be fast, inexpensive and non-disruptive for the customer choosing a CLEC as its carrier. No carrier should be advantaged or disadvantaged with regard to how customers are physically connected to competing networks. The ILECs' current network was designed to accommodate a single firm operating as a monopoly. It cannot functionally support a competitive, multi-carrier environment without significant modification. Fortunately, however, modern technology has opened new opportunities for responsibly converting the ILEC network into an efficient multi-carrier network.

The characteristics of such a network are fairly easy to define. Loops should be readily accessible at a few centralized locations, and the interface to the loops should be electronic, as it is today in the ILECs' network and when UNE-P is used. Centralized availability of digital, packetized customer signals (rather than dispersed access to physical, analog loops) would address and resolve many of the problems. First, transmitting voice signals in a digital and packet format eliminates the need for CLECs, and only CLECs, to deploy costly electronics that do not augment the types of services that may be deployed. Centralized access, highly feasible with a packet-based network infrastructure, can significantly reduce the need for, and the cost of, collocation. Equally important, packetized signals are readily redirected by software commands. This feature offers the speed, cost structure, capacity and ease of change fundamental to unconstrained competition. It removes the manual hot cut process from consideration and replaces it with electronic provisioning that is equal to that which exists for UNE-P and in the long distance marketplace. Lastly, a packet-based loop architecture would eliminate the need for competitors to adopt a circuit-switched infrastructure and permit the introduction of new services that leverage the computer controlled and higher bandwidth features of a packet-based network.

The technology and equipment necessary to realize non-discriminatory digital, centralized and packet-based loops are available today. Indeed, the digitization and packetization of voice communications can be seen as a logical extension of equipment and technology already in use by the ILECs in association with their deployment of DSL. The three major components necessary to support the necessary changes are already in service, Next Generation Digital Loop Carriers ("NGDLC"), Asynchronous Transmission Mode ("ATM") modules, and ATM-compatible equipment known as "voice gateways" or "VoATM Gateways".

Q. PLEASE SUMMARIZE THE CRITICAL ISSUE YOU DISCUSS IN YOUR TESTIMONY.

A. The critical issue of this proceeding is not whether CLECs can "deploy" their own switches. Instead, the critical issue upon which this Authority should focus is whether a CLEC can "efficiently use" its own switch to connect to the local loops of end users. The differences in the way end users' loops are connected to carriers' switches are among the most important factors that cause CLECs to face substantial operational and economic entry barrier when they seek to offer POTS to mass-market (residential and small business) customers using their own switches and ILEC-provided loops (i.e., UNE-L facilities-based entry). Without fundamental changes to the way in which the ILECs permit CLECs to gain access to the consumers' loops, the impairment found by the FCC will continue.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, at this time.

TRA Docket No. 03-00491

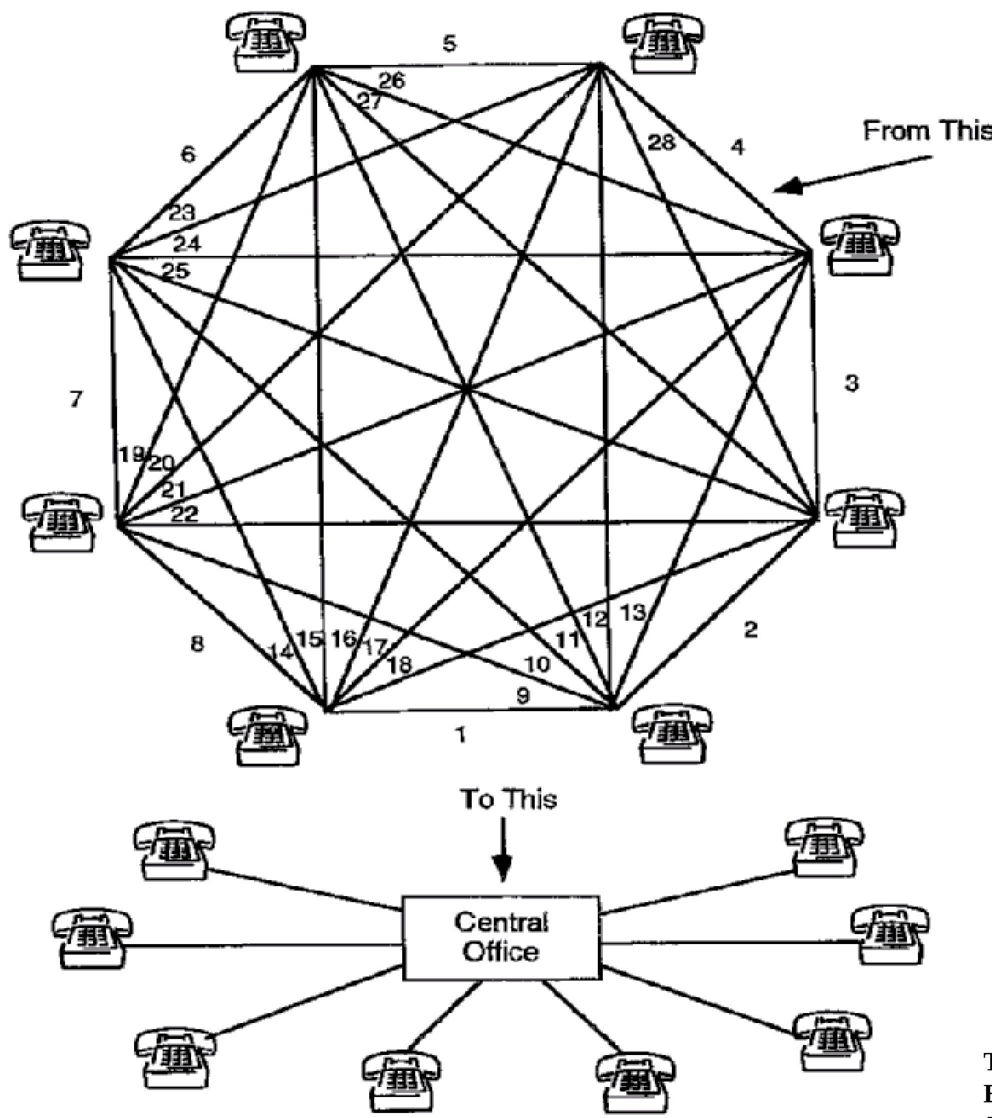
Exhibit JMB-1

Direct Testimony

of

Jay M. Bradbury

The Need for Centralized Switching



TRA Docket No. 03-00491
Exhibit: JMB-1
Jay M. Bradbury

TRA Docket No. 03-00491

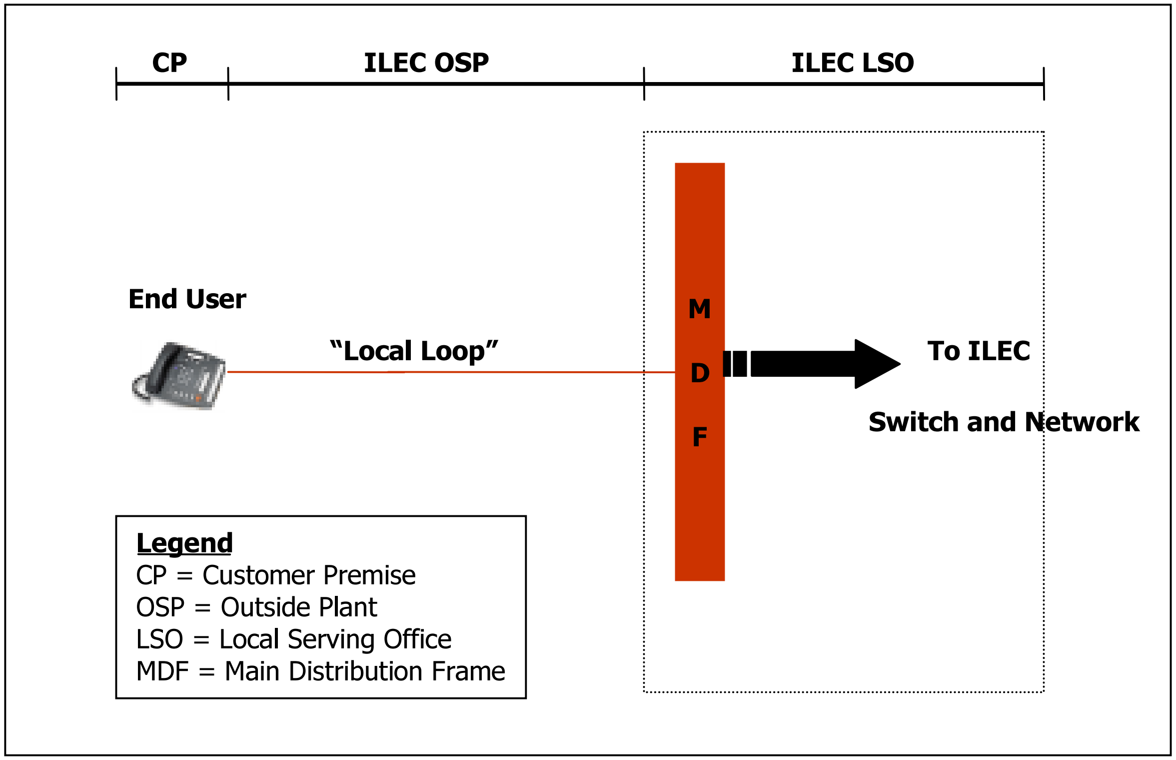
Exhibit JMB-2

Direct Testimony

of

Jay M. Bradbury

The Local Loop



TRA Docket No. 03-00491
Exhibit: JMB-2
Jay M. Bradbury

TRA Docket No. 03-00491

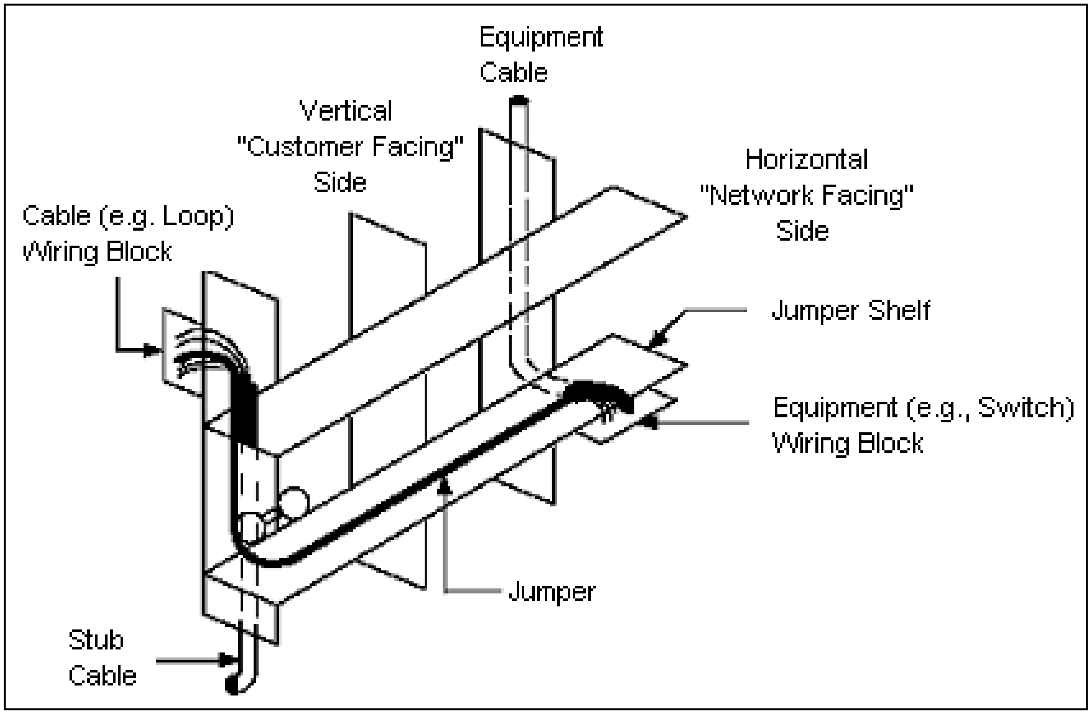
Exhibit JMB-3

Direct Testimony

of

Jay M. Bradbury

A Distribution Frame



TRA Docket No. 03-00491
Exhibit: JMB-3
Jay M. Bradbury

TRA Docket No. 03-00491

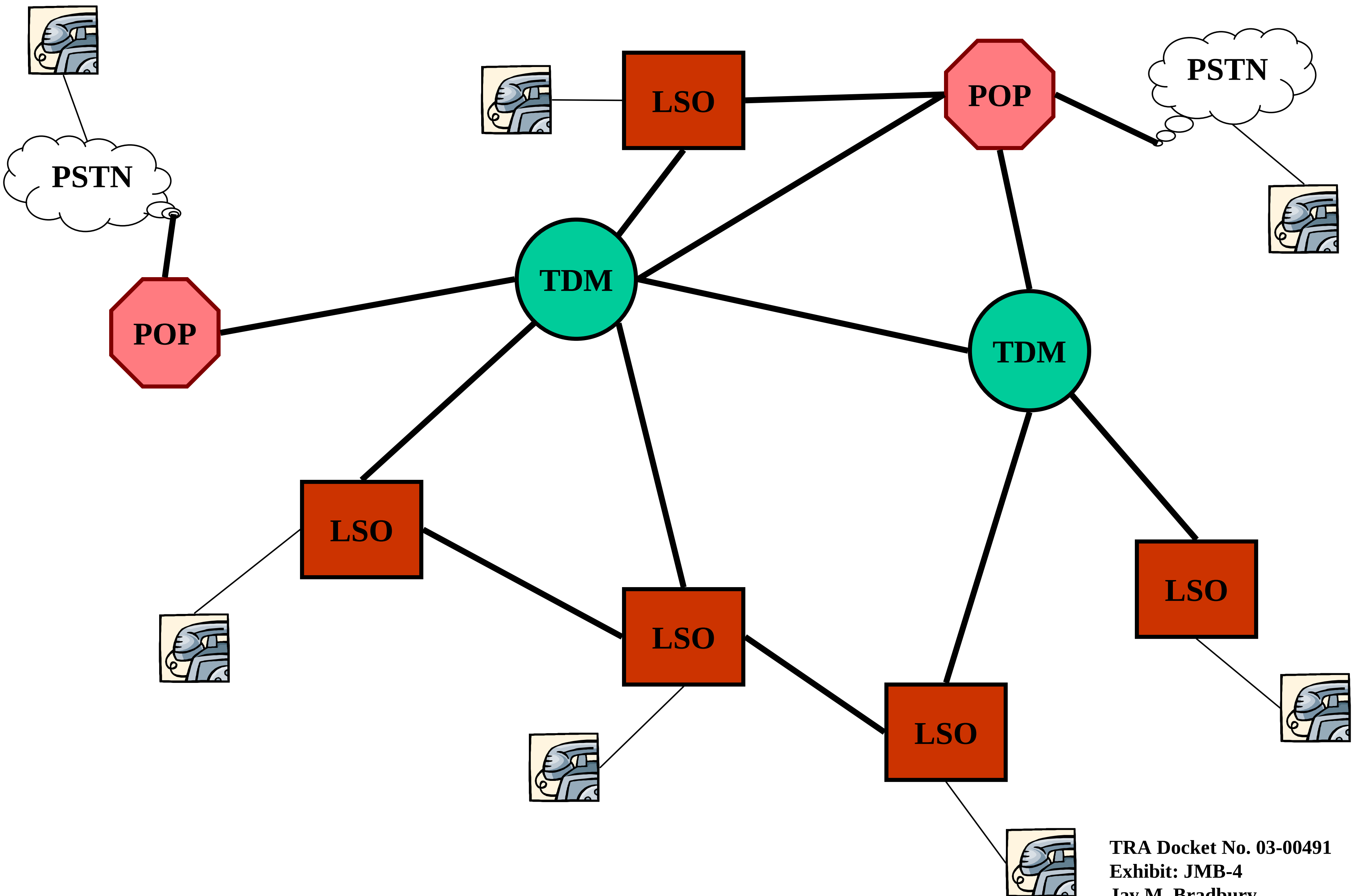
Exhibit JMB-4

Direct Testimony

of

Jay M. Bradbury

The ILEC network architecture provides efficient call termination.



TRA Docket No. 03-00491
Exhibit: JMB-4
Jay M. Bradbury

TRA Docket No. 03-00491

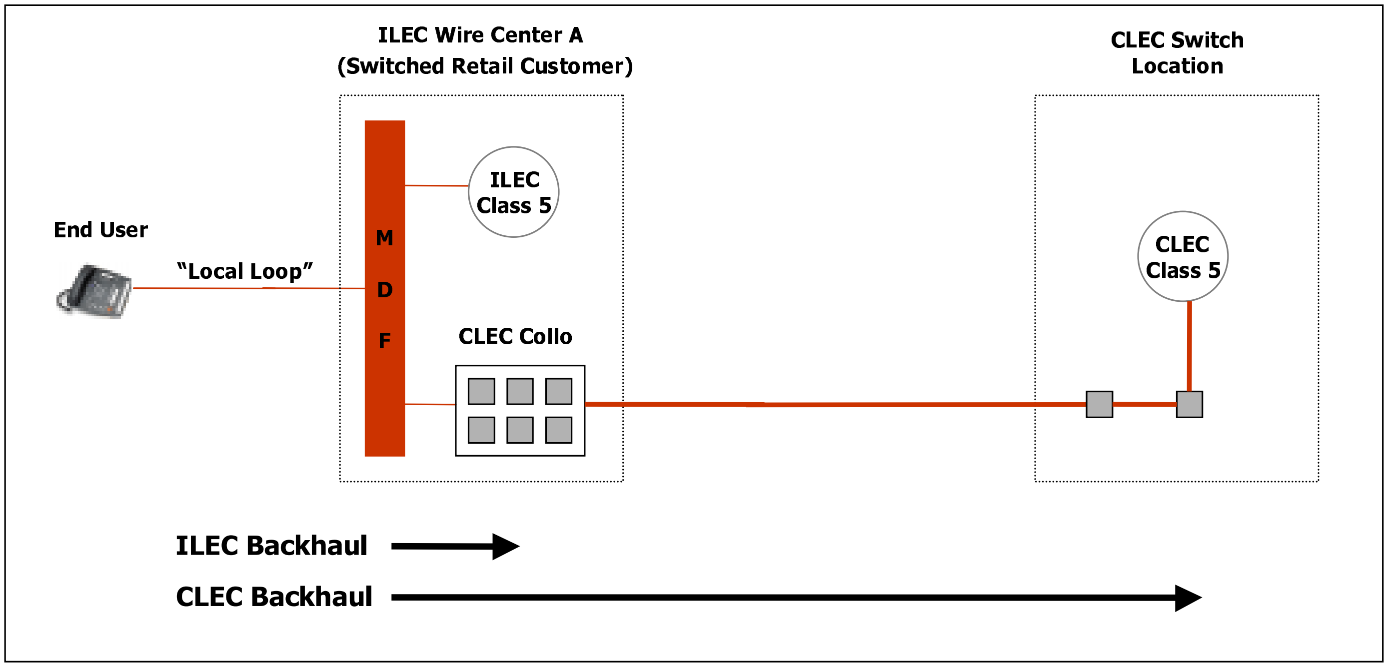
Exhibit JMB-5

Direct Testimony

of

Jay M. Bradbury

Collocation and Backhaul



TRA Docket No. 03-00491
Exhibit: JMB-5
Jay M. Bradbury

TRA Docket No. 03-00491

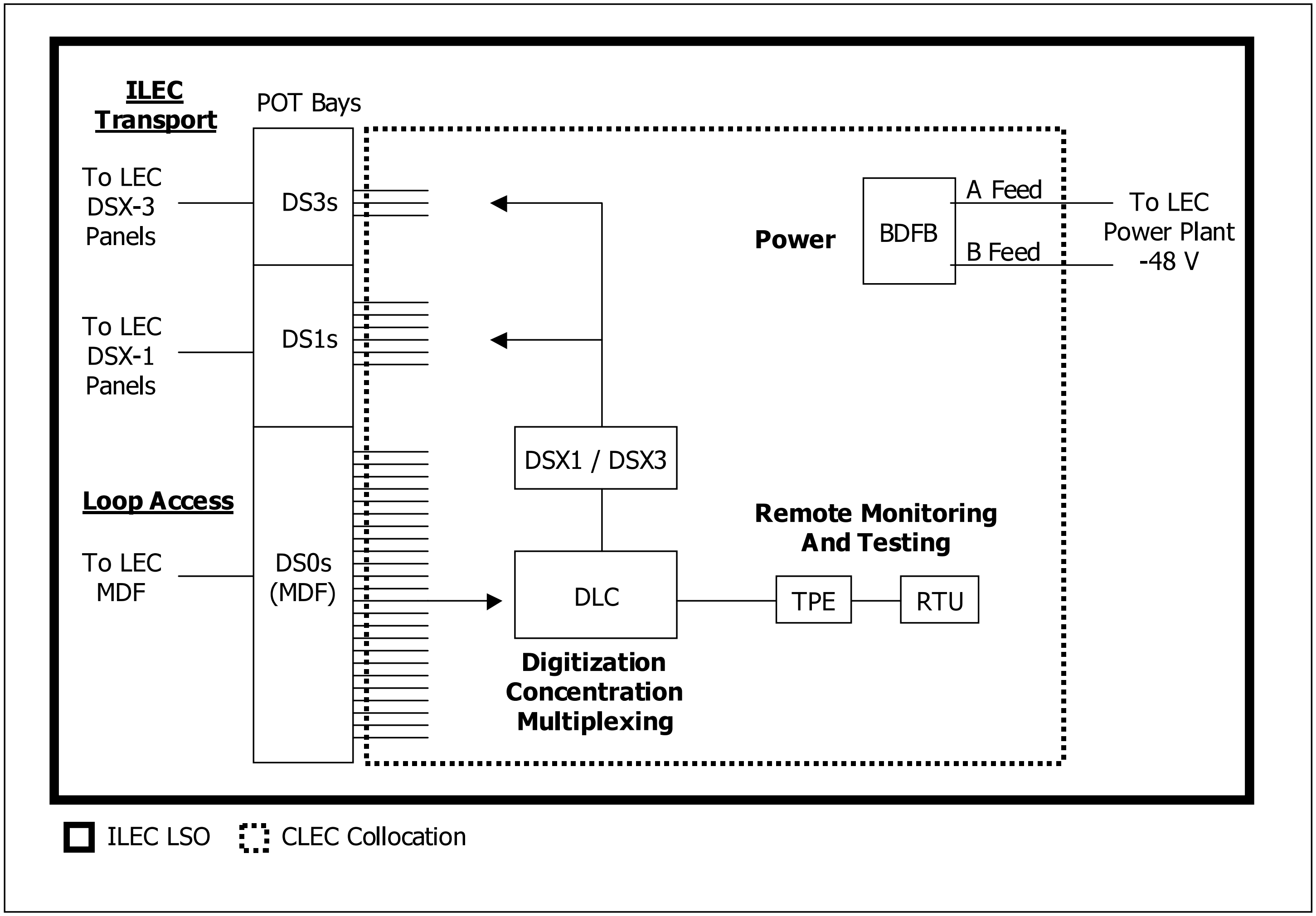
Exhibit JMB-6

Direct Testimony

of

Jay M. Bradbury

Collocation with ILEC Transport



TRA Docket No. 03-00491
Exhibit: JMB-6
Jay M. Bradbury

TRA Docket No. 03-00491

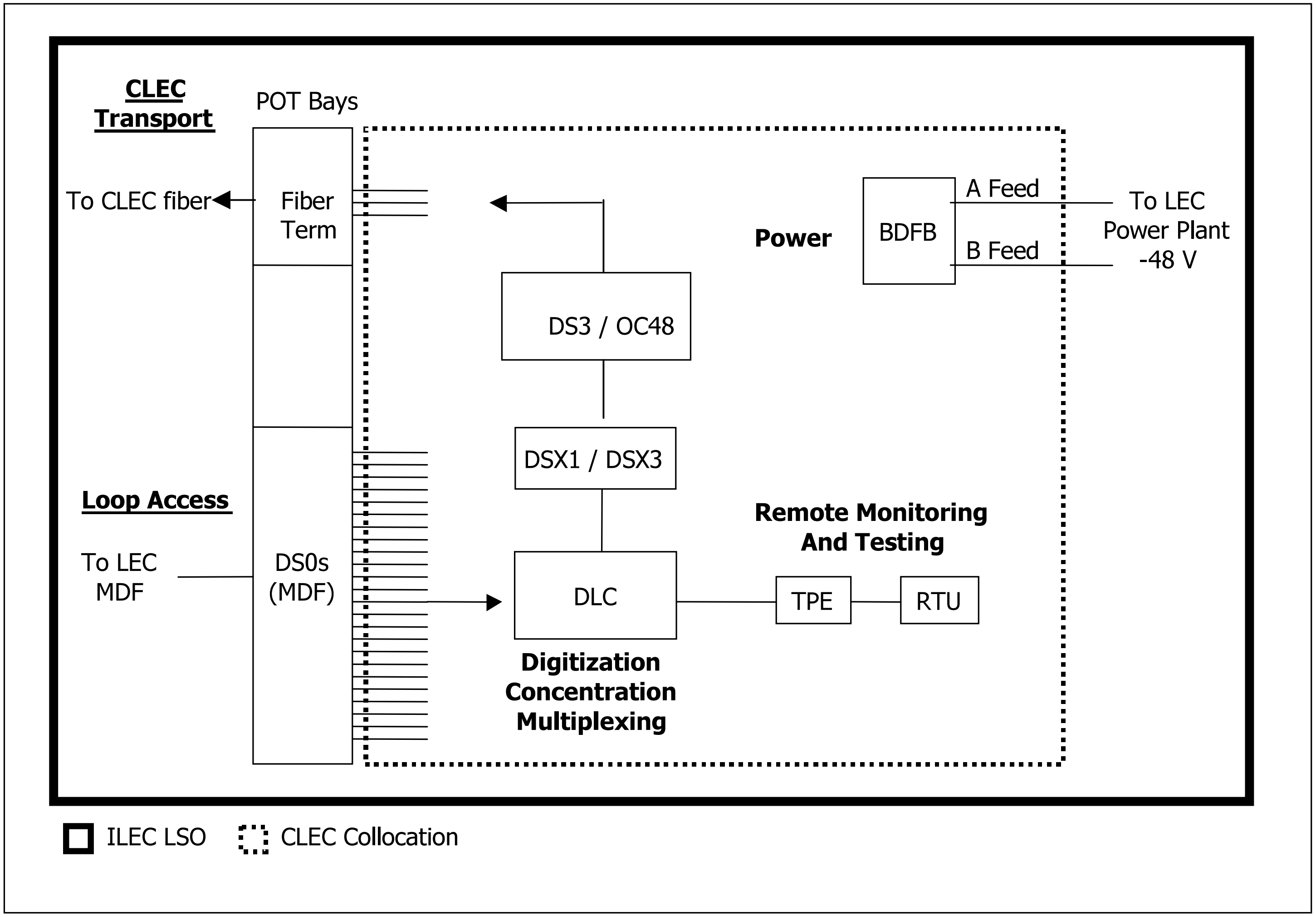
Exhibit JMB-7

Direct Testimony

of

Jay M. Bradbury

Collocation with CLEC Backhaul



TRA Docket No. 03-00491
Exhibit: JMB-7
Jay M. Bradbury

TRA Docket No. 03-00491

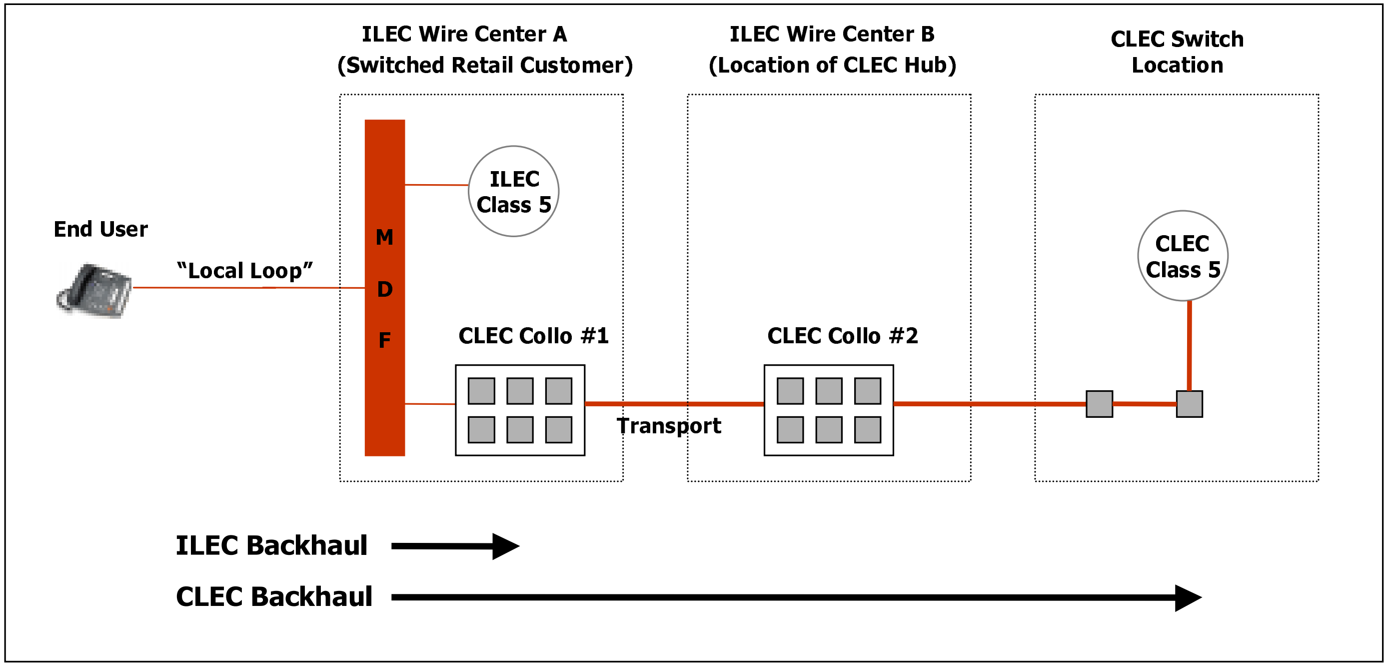
Exhibit JMB-8

Direct Testimony

of

Jay M. Bradbury

Collocation Hubbing and Backhaul



TRA Docket No. 03-00491
Exhibit: JMB-8
Jay M. Bradbury

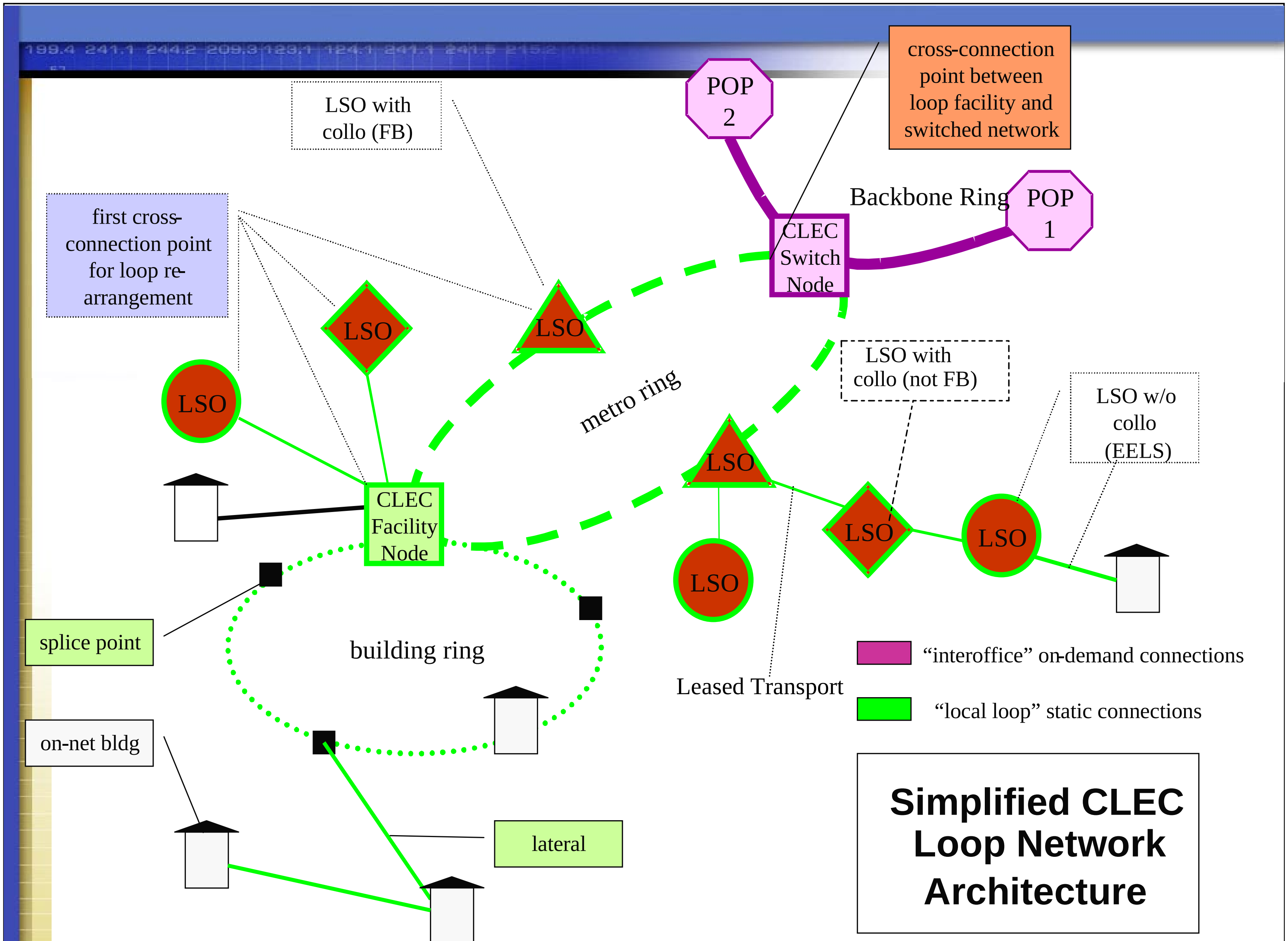
TRA Docket No. 03-00491

Exhibit JMB-9

Direct Testimony

of

Jay M. Bradbury



Simplified CLEC Loop Network Architecture

TRA Docket No. 03-00491
Exhibit: JMB-9
Jay M. Bradbury

TRA Docket No. 03-00491

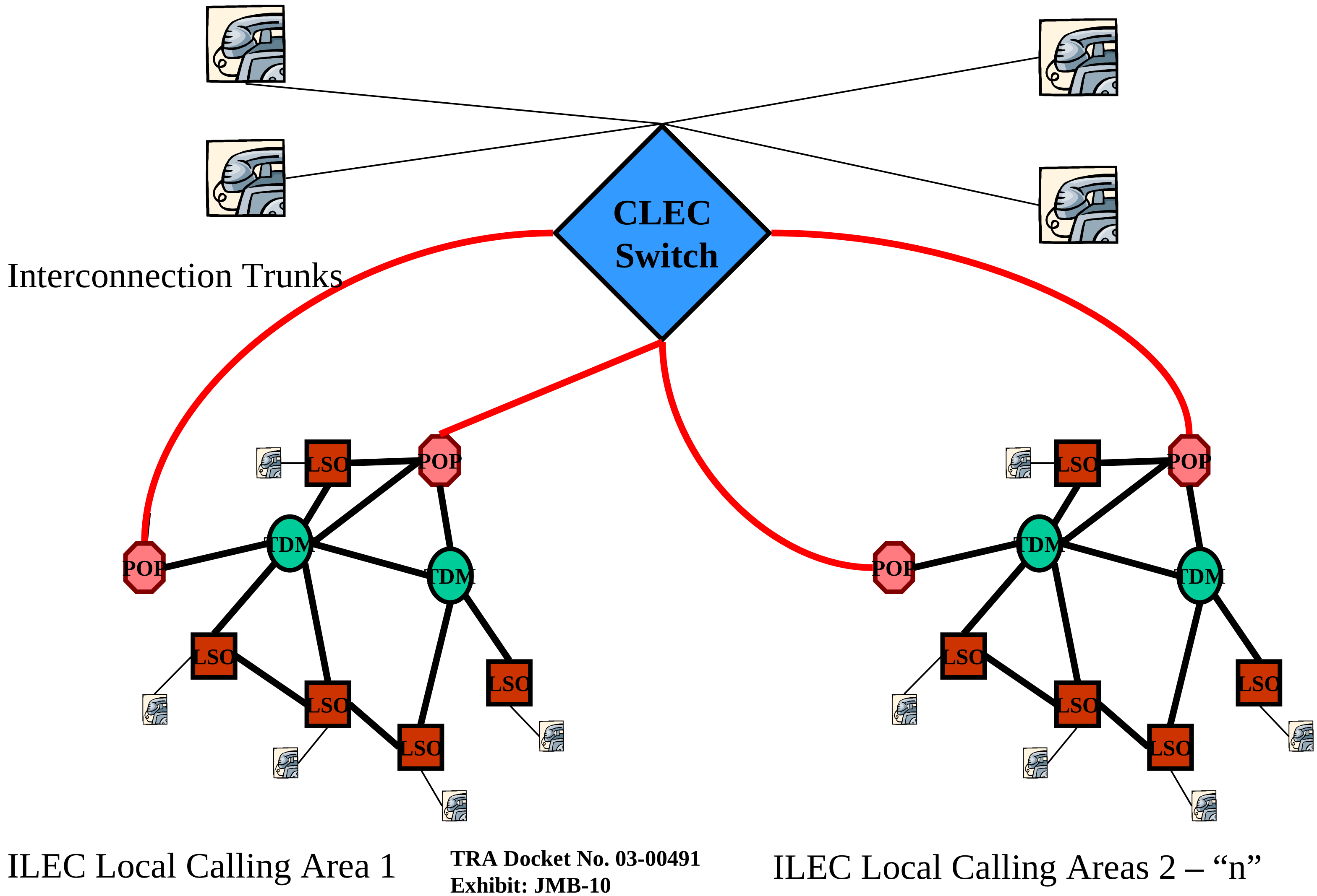
Exhibit JMB-10

Direct Testimony

of

Jay M. Bradbury

The CLEC call termination requirements span multiple ILEC local calling areas, must use the ILEC network and can not duplicate the ILEC call termination efficiencies.



TRA Docket No. 03-00491
Exhibit: JMB-10
Jay M. Bradbury

Very truly yours,

BOULT, CUMMINGS, CONNERS & BERRY, PLC

By: Henry Walker

HW/pp

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing document was served on the parties of record, via electronic service to URL link:

Guy Hicks, Esq. BellSouth Telecommunications, Inc. 333 Commerce St., Suite 2101 Nashville, TN 37201	Jon E. Hastings Boult Cummings Conners Berry, PLC P.O. Box 198062 Nashville, TN 37219-8062
Charles B. Welch, Esq. Farris, Mathews, et. al. 618 Church St., #300 Nashville, TN 37219	Dale Grimes Bass, Berry & Sims 315 Deaderick St., #2700 Nashville, TN 37238-3001
Timothy Phillips, Esq. Office of Tennessee Attorney General P.O. Box 20207 Nashville, TN 37202	Mark W. Smith, Esq. Strang, Fletcher, et. al. One Union Square, #400 Chattanooga, TN 37402
H. LaDon Baltimore, Esq. Farrar & Bates 211 Seventh Ave., N. #320 Nashville, TN 37219-1823	Nanette S. Edwards, Esq. ITC^DeltaCom 4092 South Memorial Parkway Huntsville, AL 35802
James Wright, Esq. United Telephone – southeast 14111 Capital Blvd. Wake Forest, NC 27587	Martha Ross-Bain, Esq. AT&T Communications of the South Central States, LLC 1200 Peachtree St., Suite 8062 Atlanta, GA 30309
Ms. Carol Kuhnow Qwest Communications, Inc. 4250 N. Fairfax Drive Arlington, VA 33303	Marva Brown Johnson KMC Telecom 1755 North Brown Road Lawrenceville, GA 30043
Kennard B. Woods, Esq. WorldCom, Inc. Six Concourse Parkway, Suite 600 Atlanta, Georgia 30328	

Henry Walker

BEFORE THE TENNESSEE REGULATORY AUTHORITY

NASHVILLE, TENNESSEE

IN RE:

IMPLEMENTATION OF THE FEDERAL	**)**	
COMMUNICATIONS COMMISSION'S	**)**	**DOCKET NO.**
TRIENNIAL REVIEW ORDER – 9 MONTH	**)**	**03-00491**
PROCEEDING MASS MARKET SWITCHING	**)**	

DIRECT TESTIMONY OF

STEVEN E. TURNER

ON BEHALF OF
AT&T COMMUNICATIONS OF THE SOUTH CENTRAL STATES, LLC

JANUARY 16, 2004

Table of Contents

I. INTRODUCTION OF WITNESS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Steven E. Turner. My business address is Kaleo Consulting, 2031 Gold Leaf Parkway, Canton, Georgia 30114.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I own and direct my own telecommunications and financial consulting firm, Kaleo Consulting.

Q. PLEASE DESCRIBE YOUR EDUCATION BACKGROUND.

A. I hold a Bachelor of Science degree in Electrical Engineering from Auburn University in Auburn, Alabama. I also hold a Masters of Business Administration in Finance from Georgia State University in Atlanta, Georgia.

Q. PLEASE DESCRIBE YOUR WORK EXPERIENCE.

A. From 1986 through 1987, I was a Research Engineer for General Electric in its Advanced Technologies Department developing high-speed graphics simulators. In 1987, I joined AT&T and, during my career there, held a variety of engineering, operations, and management positions. These positions covered the switching, transport, and signaling disciplines within AT&T. From 1995 until 1997, I worked in the Local Infrastructure and Access Management organization within AT&T. In this organization, I gained familiarity with many of the regulatory issues surrounding AT&T's local market entry, including issues concerning the unbundling of incumbent local exchange company ("incumbent" or "ILEC") networks. I was on the AT&T team that negotiated with Southwestern Bell Telephone Company concerning unbundled network element definitions and methods of interconnection. A copy of my resume is provided as Exhibit SET-1.

Q. HAVE YOU PREVIOUSLY TESTIFIED OR FILED TESTIMONY BEFORE A PUBLIC UTILITY OR PUBLIC SERVICE COMMISSION?

A. I have testified or filed testimony before the commissions in the states of Alabama, Arkansas, California, Colorado, Delaware, Florida, Georgia, Hawaii, Illinois, Indiana, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New Hampshire, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Dakota, Texas, Washington, and Wisconsin. Additionally, I have filed testimony before the Federal Communications Commission ("FCC").

II. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. My testimony describes and quantifies the significant cost disadvantages that an efficient competitive local exchange carrier ("CLEC") would confront in attempting to serve mass market customers if continued access to unbundled local switching and the unbundled network element platform ("UNE-P") were denied. My testimony demonstrates that in the absence of unbundled local switching, CLECs face practically insurmountable cost disadvantages relative to the Incumbent Local Exchange Carriers ("ILECs") if unbundled network element loops ("UNE-L") used in conjunction with their own (or a third party provider's) switching is the sole option for providing local services to mass market customers.[1] The FCC's Triennial Review Order ("TRO") recognized that the "absolute cost advantages" enjoyed by an ILEC can constitute a barrier to entry that would satisfy the impairment standard.[2]

Q. GENERALLY, WHAT COSTS COMPRISE THE COST DISADVANTAGE THAT AN EFFICIENT CLEC WOULD INCUR TO SERVE ITS CUSTOMERS USING UNE-L?

A. A CLEC seeking to serve mass market customers using its own switches would incur the costs for backhauling a customer loop from the ILEC central office to the CLEC's switch (i.e., "backhaul costs") as well as attendant costs for transitioning the customer's service from the ILEC to the CLEC (i.e., hot cut costs, number portability).

To accomplish this, the CLEC must first deploy a costly "backhaul"[3] infrastructure between the ILEC central office where it seeks to serve mass market customers and the physical locations where its switches are located. As described in the accompanying Testimony of AT&T's witness Jay Bradbury, creation of this backhaul infrastructure typically entails (1) the cost of preparing the loop for transport out of the ILEC's central offices, and (2) the cost of

---

1 The significant disadvantages I describe apply whether a CLEC uses self-provided switching or switching that is provided by a separate non-ILEC entity. For simplicity in presentation, I will discuss these cost disadvantages in the context of self-provided switching. However, they would also apply if a CLEC attempted to provide service to mass-market customers using "wholesale" switching provided by another carrier.

2 *In the Matter of Review of Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers; Implementation of the Local Competition Provisions of the Telecommunications Act of 1996; Deployment of Wireline Services Offering Advanced Telecommunications Capacity*, CC Docket Nos. 01-338, 96-98, and 98-147 (FCC, Rel. August 21, 2003) ("*TRO*"), ¶ 90.

3 Backhaul is the term used to describe the process and equipment needed to haul the customer's loop from the ILEC's central office where the customer loop terminates to the CLEC's switch in another location so that voice service can be provided to the customer.

transporting the traffic back to the CLEC's switch location.[4] In addition, a CLEC must incur the costs of "hot cuts"[5] and number portability. Number portability is a critical capability established as a result of the Act. Number porting permits the customer to retain and freely move his/her telephone number amongst competing networks.[6] My testimony focuses upon these components of the absolute cost disadvantages associated with this CLEC "backhaul,"[7] and hot cut costs associated with connecting a customer's loop with the CLEC switch which are highly significant and contribute to the impairment a CLEC faces in using self-provided switches to serve mass-market customers.

Q. HOW HAVE YOU QUANTIFIED THIS ABSOLUTE COST DISADVANTAGE?

A. The "impairment analysis tools" that underlie my testimony quantify these *additional* costs of loop connectivity incurred by CLECs, but not by the ILEC, if CLECs are required to provide facilities-based mass-market local services based upon a voice grade UNE-L architecture.[8] In performing this analysis, I have

---

4 The cost of preparing the loop for transport out of the ILEC's central office includes: (1) the costs of acquiring collocation space in the offices in question; and (2) the deployment of electronic equipment in that space (a) to convert an end user's traffic from the analog signals generated by standard telephone sets to digital signals, and (b) to concentrate and multiplex those digital signals.

5 "Hot cuts", as an example, are the transfer of the customer's active service with the ILEC to the CLEC by transferring the customer's loop from the ILEC switch to the CLEC switch with as minimal an interruption to the customer's service as possible.

6 *See* Direct Testimony of AT&T Witness Mark Van De Water.

7 Other cost disadvantages may also exist for the CLEC, such as in customer acquisition cost or in OSS platform fixed costs that I do not address but which may also add to the CLEC's disadvantage beyond the level that I quantify.

8 As discussed in the Direct Testimony filed by Jay Bradbury, these costs are a product of the "closed" legacy network architecture employed by the ILEC.

followed the FCC's admonition not to examine results for a specific CLEC;[9] instead, my analysis focuses on a hypothetical, efficient CLEC. I also have made a conscious effort to be conservative with respect to inputs and assumptions. As will become clear from the results of this analysis, the most conservative assumption, given current conditions, is the working premise that a CLEC would enter the market using a facilities based and voice grade UNE-L architecture to serve the mass market at all because there are no offsetting absolute CLEC cost advantages available to offset these CLEC cost disadvantages.

As a result, the tools I use calculate the *minimum* level of cost disadvantage an efficient CLEC would face. In order to provide the degree of "granularity" required by the FCC's order, the tools utilize data that is specific to BellSouth's operations in Tennessee.

Q. HOW IS THE REMAINDER OF THIS TESTIMONY ORGANIZED?

A. The remainder of my testimony is organized as follows. Section III provides the background to my analysis and an overview and summary of the results. I provide results based by LATAs in the BellSouth-Tennessee territory.

The discrete analysis of BellSouth's central offices in Tennessee, upon which the LATA results are based, covers a broad range of lines. Not surprisingly, the absolute cost disadvantage per line is highest in those central offices where a CLEC can be expected to serve a relatively small number of mass market lines, and lower in those central offices where a CLEC can be expected to serve a

---

9 *TRO* at ¶¶ 115-116, ¶ 517.

relatively larger number of lines. Nevertheless, even when a very substantial number of lines is served in an individual office the unit cost disadvantage experienced by the CLEC for backhaul and hot cuts is substantial. As explained more fully in the accompanying economic testimony of AT&T's witness Don Wood, ILEC cost advantages of the magnitude I have calculated for all wire centers in BellSouth-Tennessee constitute an entry barrier that preclude mass-market local competition without access to unbundled local switching.

Section IV of my testimony describes, in general terms, the tools that I relied upon to measure the CLECs' cost disadvantage and the analysis that has been undertaken for BellSouth-Tennessee LATAs using those tools. A more detailed explanation of the technical aspects of the tools, including an overview of the calculations the tools perform, is set forth in the Technical Appendix that is attached to this testimony as Exhibit SET-2. Exhibit SET-3, which is an electronic exhibit on a CD-ROM, contains the electronic version of the DS0 Impairment Analysis Tools, User Manual, as well as the results by LATA for BellSouth in Tennessee. Finally, in Section V, I present the results for BellSouth in each LATA in Tennessee. These results are supplemented in detail by the information contained in Exhibit SET-3. Included in that discussion is a description of the inputs and sources of the inputs used. The results demonstrate that CLECs cannot practically overcome the significant cost disadvantages identified in this study. Thus, the modeling results for the "hypothetical CLEC" and actual market experience are entirely consistent: there currently is a notable absence of actual, broad based facility-based competition for mass market customers using voice grade UNE-L which corroborates the FCC's national finding of impairment for switching to serve mass market customers.

III. BACKGROUND AND SUMMARY OF RESULTS

A. Impairment Resulting From Absolute Cost Disadvantages Experienced by a CLEC, and the Network Architectures That Create That Impairment

Q. YOU HAVE PREVIOUSLY REFERRED TO AN ABSOLUTE COST DISADVANTAGE THAT A CLEC ENCOUNTERS WHEN USING SELF-PROVIDED SWITCHING TO SERVE MASS MARKET CUSTOMERS. COULD YOU EXPLAIN THIS CONCEPT IN MORE DETAIL?

A. Among the types of barriers to entry that the FCC expressly recognized in the TRO are "absolute cost advantages" enjoyed by the ILEC,[10] or absolute cost disadvantages experienced by the CLEC.[11] That is, competitors will be impaired if, in the absence of unbundling, an efficient CLEC would incur substantially higher costs than do the ILECs in order to self deploy the network facility in question. Thus, as the FCC observed, "[w]hen the incumbent LEC has absolute cost advantages, other firms may be deterred from entering the market."[12]

Q. WOULD A HYPOTHETICAL EFFICIENT CLEC USING SELF-PROVIDED SWTICHING TO SERVE THE MASS MARKET EXPERIENCE ABSOLUTE COST DISADVANTAGES AS COMPARED TO BELLSOUTH?

A. Yes.

---

10 *See*, *e.g.*, *TRO*, ¶ 90.

11 *Id*. at ¶ 112.

12 *TRO* at ¶ 90 and n. 302. This is particularly so if the ILEC is providing service at rates close to its average cost. *Id*.

Q. WOULD THIS RESULT IN THE CLEC BEING IMPAIRED IN ITS ABILITY TO PROVIDE SERVICE TO MASS MARKET CUSTOMERS IN TENNESSEE?

A. Yes.

Q. WHY?

A. The absolute cost disadvantages analyzed in my testimony are created by differences in the basic characteristics of the network architectures employed by ILECs, on the one hand, and CLECs on the other. The network architecture testimony presented by Jay Bradbury describes these important differences in the network configurations employed by CLECs and ILECs in detail. These differences, which I summarize briefly below, are generally recognized and were explicitly acknowledged by the FCC in the *TRO*.[13]

Q. GENERALLY, HOW WAS AN ILEC'S NETWORK DESIGNED?

A. The ILECs' local networks were designed in a monopoly environment. As a result, they rely upon an integrated network architecture that does not easily allow for multiple carriers to access a customer's loop to provide voice service.

The ILEC network was designed and built based upon analog (and largely copper-based) technology. Because analog signals degrade over distance, copper loops could not exceed relatively short lengths without the need for expensive equipment to ensure that the voice signal could travel from the caller to the called party. As a result, the ILECs deployed – and by virtue of their historical monopoly position they were able to deploy – a relatively large number of local switches, each of which served a relatively small geographic area limited

[13] *See*, *e.g.*, *TRO* at ¶ 480.

generally to an area determined by the length of copper that could practically support voice services.[14] Furthermore, because a switch was placed at the termination point for these analog loops, ILECs could inexpensively connect their customers' loops to their switches by using a simple set of "jumper" wires across the main distribution frame ("MDF"). And for the vast majority of mass market customers, those jumper pairs are left in place even when a customer moves, so that when a new customer moves in to this same residence or small business location, the ILEC can re-activate service through the use of software commands from a service representative without the need for any physical work.

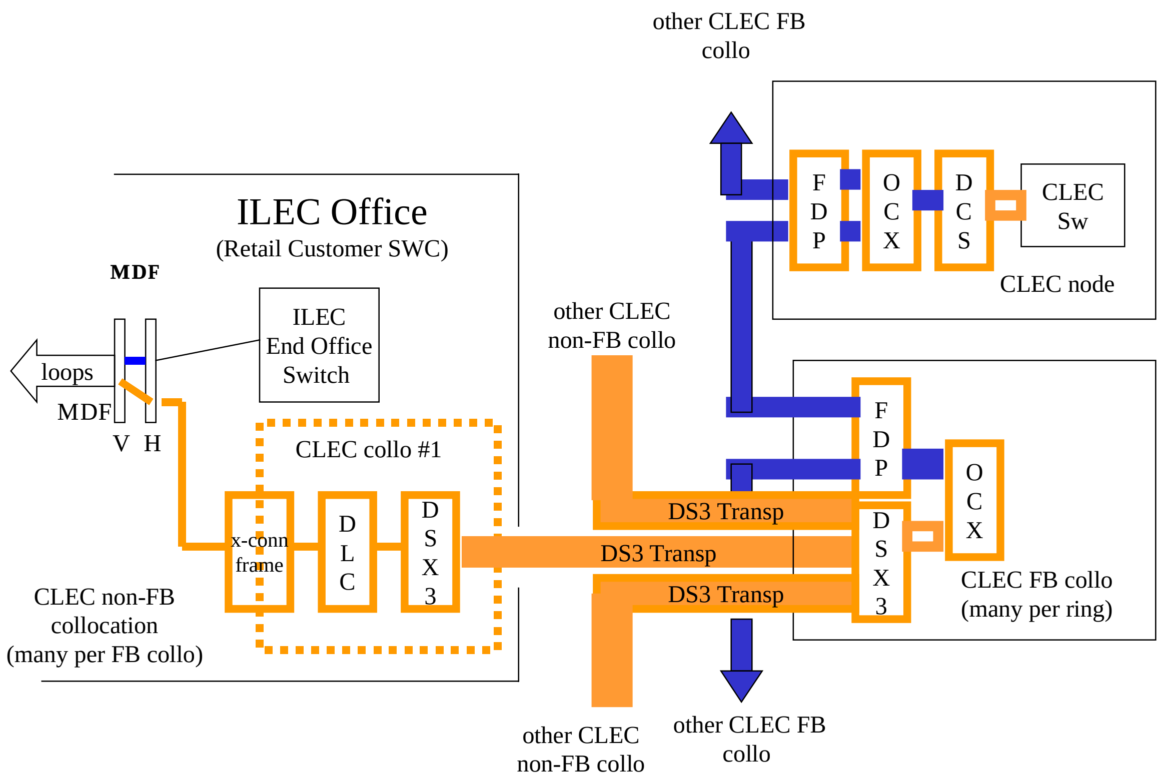
Q. DOES THE CLEC NETWORK DESIGN DIFFER FROM THE ILEC NETWORK?

A. Yes. The diagram below displays the facilities that a CLEC must employ to connect a customer loop to its switch, and compares them to the facilities an ILEC needs to perform the same functions. The DS0 Impairment Analysis Tools quantify the *minimum* equipment and network functionality that a facilities-based efficient hypothetical CLEC (*i.e.*, a CLEC providing its own switching) would need to extend a customer's UNE loop obtained from the ILEC central office where the customer's loop terminates to the CLEC's own switch, which is also depicted in Figure 1 (the larger orange and blue lines running from the MDF to the CLEC Switch).

Figure 1

[14] As the FCC confirms in the TRO, in recent years the ILECs have deployed increasing amounts of fiber optic equipment in the "feeder" portion of the loop, but the "distribution" portion of loop plant – that connecting to the customer's premises – remains almost entirely copper, and the basic architecture characterized by a high density of local offices/switches where customer loops are terminated remains the same.

Comparison of CLEC Backhaul Network
With ILEC Cross-Connect



Q. HOW DOES THE CLEC NETWORK DESIGN DIFFER FROM THE ILEC NETWORK DESIGN?

A. The local network architecture employed by an efficient CLEC that is self-providing switches is very different from the ILEC network. Because CLECs are attempting to enter markets that have long been dominated by a single monopoly provider, they are unlikely – even in the medium to long term – to be able to generate sufficient customer volume for it to make economic sense to place their own switches at locations close to each ILEC central office. Instead, a CLEC must provide service to customers from multiple ILEC central offices with a single switch in order to generate a sufficient volume of customer line terminations and calls per switch that is comparable to the customer line terminations and call volume on a switch that is on average achieved by ILECs.

As a result, the CLEC must deploy extensive equipment – which is a large and substantially demand insensitive cost – to extend each and every loop from collocations located at various ILEC wire centers to its local switches. In order to extend customer loops to its switches, a CLEC must install and maintain Digital Loop Carrier (DLC) equipment in each ILEC central office where the customer's analog loops (voice grade UNE-loops) are located. This DLC equipment, as previously mentioned, is used to digitize, concentrate and multiplex the traffic delivered over these analog loops to permit efficient backhaul from the ILEC central office where the customer's loop terminates to the distant CLEC switch without substantially reducing the quality of the customer's voice service. The DLC deployed by the CLEC must permit the distant CLEC switch port to interoperate with the customers' telephone sets to enable the CLEC to provide such capabilities as dial tone and the ability to ring the customer's telephone set. In addition, the CLEC must have connectivity between the DLC (in the collocation space) and its switch so that the voice signal has a path to travel between those two points.[15] Finally, once this expensive backhaul infrastructure is deployed, the CLEC must arrange for, and pay ILEC charges for a hot cut. In addition, the CLEC may incur charges for number portability when the customer

[15] The need to deploy equipment to "backhaul" the customer's loop to the CLEC switch in connection with UNE-L has been recognized by the FCC: "The need to backhaul the circuit derives from the use of a [CLEC] switch located in a location relatively far from the end user's premises, which effectively requires competitors to deploy much longer loops than the incumbent." *TRO* ¶ 480.

wants to maintain the phone number it previously had with the ILEC for each active customer loop it migrates to its network.

Q. DO THESE DIFFERENCES IN NETWORK DESIGNS RESULT IN DIFFERENT COSTS TO PROVIDE SERVICE TO MASS MARKET CUSTOMERS FOR CLECS USING UNE-L AND ILECS?

A. Yes. The crucial economic fact is that costs to backhaul customer lines to the CLEC switch, hot cuts to provision the migration of service to the CLEC switch with limited service interruption, and number portability to maintain the customer's same telephone number are not faced by the ILEC. Unlike a CLEC seeking to use the UNE-L architecture, the ILEC connects its loops and switching using a simple, inexpensive copper wire pair cross-connection in the central office where its loops terminate. Thus, the ILEC's "backhaul" network consists of only a relatively short pair of jumper wires.

Collectively, the CLEC's costs associated with collecting and backhauling its customers' loops to its switch to create the same functionality as the ILEC's "short pair of jumper wires" represents an absolute cost disadvantage and results in a substantial barrier to market entry using UNE-L in Tennessee. The analytical tools described in my testimony, which I refer to generally as "DS0 Impairment Analysis" tools, identify and quantify the *absolute cost disadvantages* a CLEC would likely face if it sought to broadly serve the mass-market in a particular area with a relatively ubiquitous backhaul network using voice grade UNE-L. Conversely, the backhaul disadvantage represents a significant component of ILEC profit margin that is never eroded even if an efficient CLEC actually entered these markets in the face of such a disadvantage.

B. Overview of Results

Q. WILL YOU GIVE AN OVERVIEW OF THE DS0 IMPAIRMENT TOOLS THAT YOU USED TO QUANTIFY THE ABSOLUTE COST DISADVANTAGE THAT AN EFFICIENT CLEC WOULD EXPERIENCE AS COMPARED TO BELLSOUTH?

A. Yes. However, a more detailed description of the DS0 Impairment Analysis Tools is contained in Section IV and in the accompanying technical appendix (Exhibit SET-2). In addition, the LATA results for Tennessee are set forth in Section V, which also contains a general discussion of the inputs employed (along with the specific inputs used for each LATA analysis).

Broadly speaking, the DS0 Impairment Analysis Tools calculate the costs that CLECs face in three broad categories: (1) preparation of the loop for transport from ILEC central offices (including DS0 equipment infrastructure and collocation); (2) backhaul transport between the ILEC's central offices and the CLEC's switch; and (3) customer transfer costs for hot cuts and number portability. The tools use inputs that are based upon the experience and judgment of subject matter experts (SMEs) as to the costs an efficient CLEC would incur to provide the backhaul and customer transfer functions efficiently.[16] In other instances, the costs are developed using state-approved rates (*e.g.*, for elements of the cost of collocation and hot cuts) or interstate charges (*e.g.*, the cost of high capacity special access facilities, purchased under multi-year term plans). As noted earlier, it is my opinion that the methodology employed and the inputs used produce conservative results. That is, they tend to reflect relatively *low* estimates

[16] *See* generally *TRO*, ¶ 517, providing that costs should be based on the entry of an efficient CLEC, not any particular CLEC.

of the absolute cost disadvantage that would be experienced by a "hypothetical efficient CLEC" that is attempting to enter the local market using UNE-L. Of course, CLECs could experience far higher costs depending upon their customer base.

Q. CAN YOU PROVIDE AN OVERVIEW OF THE DOLLAR AMOUNT FOR THE COST DISADVANTAGE THAT A CLEC WOULD FACE USING UNE-L?

A. The results of my analysis, which are shown in Section V, support the conclusion that hypothetical efficient CLECs face substantial, absolute cost disadvantages relative to the ILEC in each geographic market in which BellSouth has elected to challenge the FCC's national finding of impairment. Those cost disadvantages range from a high of $17.98 per line per month to a minimum of $15.71 for the Tennessee LATA study areas.[17]

Q. WHAT DOES THE MINIMUM IMPAIRMENT DOLLAR FIGURE REPRESENT?

A. The latter minimum figure in fact provides a shorthand basis – and a conservative one at that (for the reasons I have previously discussed) – for supporting a general finding of economic impairment in Tennessee consistent with the FCC's national finding of impairment. As noted earlier, an important characteristic of impairment is that the number of customer lines a CLEC serves in a given ILEC central office (as distinct from the absolute size of the ILEC central office) is a key determinant of the absolute cost disadvantage. Thus, the cost disadvantage of

[17] These costs *do not include* the monthly recurring charges paid to the incumbent simply to lease an unbundled loop. Thus, to the extent that the TELRIC costs paid by a CLEC to lease the loop are higher than the ILEC's efficient costs for providing the loop to itself, such cost disadvantages are not reflected.

serving 500 lines in a 5,000 line office would be much the same as the cost disadvantage of serving 500 lines in a 50,000 or 100,000 line office. That is because collocation charges and hot cut costs do not vary based on the ILEC office size, and the backhaul cost is largely a fixed cost related to the type of DLC deployed and the designation used by the tools for a particular ILEC central office (*i.e.*, whether it is a "node" or "satellite," *see* infra.). Generally, therefore, the average cost disadvantage per line decreases as the number of lines served in an office increases, but the important point is that it *never* drops below a level of absolute cost disadvantage that would preclude mass-market competition.

Thus, even if a CLEC serves a very substantial number of lines in an individual central office in Tennessee, the minimum cost impairment per line I cite above would nevertheless constitute a cost penalty that is competitively disqualifying under any reasonable measure.

As discussed in the testimony of Don Wood, a CLEC cost disadvantage of the magnitude described above constitutes a clear barrier to entry and should by itself satisfy any reasonable definition of "impairment."

Q. HOW DOES THE IMPAIRMENT FOR CLECS CALCULATED BY THE DS0 IMPAIRMENT TOOL COMPARE TO CLEC IMPAIRMENT COSTS CALCULATED BY ILECS?

A. The types of costs and the general levels of impairment I have identified are consistent with calculations submitted by ILECs during the FCC proceedings leading up to the *TRO*. In January, 2003, for example, SBC Communications, Inc. ("SBC") submitted an Ex Parte letter to Chairman Powell from James C. Smith, a Senior Vice President of SBC ("SBC Ex Parte"). This letter is appended as Exhibit SET-4 to my testimony. Attachment 3 to that letter is a document entitled "SBC's Analysis of the Economic Viability of Facilities-Based UNE-L Residential Serving Arrangements," in which SBC claims that it "compares the cost of a UNE-L-based serving arrangement with the revenue stream a CLEC could reasonably anticipate when serving residential customers." *Id.*, p. 1.

In its ex parte SBC identified a series of cost categories that CLECs might incur in using UNE-L to serve residential customers that would not also be incurred by ILECs. These include:

- payments by CLECs to ILECs for hot cuts (SBC appears, however, to have excluded internal CLEC costs that would be incurred to implement the hot cut process (*Id.* at 3);
- the costs of collocation (*Id.* at 4-5);
- the costs of GR-303 concentration and multiplexing equipment (*Id.* at 5); and
- transport costs (*Id.* at 7).

These are the very same cost elements that are reflected in the tools and calculations that I discuss below.

For the three states that SBC analyzed, *i.e.*, California, Michigan and Texas, SBC developed estimated cost differentials that totaled respectively $10.74, $10.88 and $10.74 per line for these cost components for a central office in which a CLEC would serve 250 lines; and $9.00, $7.85 and $8.80 per line, respectively, for these cost components for a central office in which a CLEC would serve 500 lines.[18]

[18] *See* February 4, 2003 Ex Parte letter from Joan Marsh, AT&T Director of Federal Government Affairs, to Ms. Marlene Dortch, Secretary, Federal Communications Commission in CC Docket Nos. 01-338, 96-98, and 98-147, appended hereto as Exhibit SET-5. Note that for a 100 percent increase in lines served, the impairment per line declines only 16 to 29 percent, depending on the state.

Thus, SBC's own analysis presented to the FCC shows that the cost disadvantage faced by a CLEC – essentially the same cost disadvantage discussed in my testimony – is substantial.

IV. THE DS0 IMPAIRMENT ANALYSIS TOOLS

A. Overview

Q. CAN YOU EXPLAIN HOW THE DS0 IMPAIRMENT TOOLS WORK?

A. Because UNE-L entry requires CLECs to connect ILEC loops to their own switches, the forward-looking cost of such connections is central to any analysis of the economic viability of UNE-L as an entry strategy to serve mass-market customers. The DS0 Impairment Analysis Tools described in this section of my testimony compute the loop-related impairment costs of providing service that would be incurred by an efficient CLEC using UNE-L that are *not* incurred by incumbents. Again, the analysis reflects the anticipated experience of a hypothetical, efficient CLEC seeking to broadly serve the mass market using UNE-L, rather than focusing on the business strategy of any particular competitive carrier.

Q. DO THE DS0 IMPAIRMENT TOOLS MAKE ASSUMPTIONS REGARDING THE CUSTOMER BASE OF AN EFFICIENT CLEC?

A. Yes, there are four important sets of assumptions. *First,* the DS0 Impairment Tools require an assumption about the market share of mass market customers a hypothetical efficient CLEC is expected to achieve. *Second,* it employs assumptions about how rapidly a CLEC will acquire that market share. *Third,* as discussed above, it assumes that transport costs will be defrayed by traffic for both enterprise and mass market customers, which has the effect of reducing backhaul transport costs included as impairment. *Fourth*, it requires estimates of customer “churn,” *i.e.*, how long a hypothetical efficient CLEC can expect to keep a customer that it takes from the ILEC or another CLEC.

The DS0 Impairment Tools assume that an efficient hypothetical CLEC will benefit by serving both the enterprise and the mass-market customers, particularly in the area of self-provided transport. Self-provided transport cannot generally be justified solely by local voice demand, particularly if only mass-market customers are considered. If, in particular, data networking and long distance demand of enterprise customers cannot be addressed, there are limited instances where self-provided facilities are economically justifiable. The DS0 Impairment Analysis Tools deploy self-provided facilities between large incumbent offices, and assume that these facilities are also utilized for mass-market backhaul. Thus, the calculations described here assume that the CLEC has an active enterprise business. If it did not, there would be no basis for hypothesizing the existence of self-provided fiber facilities between ILEC offices. Apportioning costs of node-to-node transport between mass market and enterprise customers is one of many ways that the Impairment Analysis Tools assume the efficient sharing of facilities used to serve mass market customers. In addition, where there are facility-based collocations, the DS0 backhaul infrastructure reflects the economies of shared use between mass market and enterprise customers.

Q. DO THE IMPAIRMENT TOOLS MAKE ANY ASSUMPTIONS ABOUT REVENUES GENERATED BY MASS MARKET CUSTOMERS?

A. No. As noted earlier, the DS0 Impairment Tools are designed only to quantify the absolute cost disadvantage experienced by a hypothetical efficient CLEC. Revenues are not relevant to this determination. Revenues would be highly relevant to an analysis of whether entry could be profitable, given the level of cost impairment calculated by the DS0 impairment tool, but that is not the subject of this testimony.

Q. CAN YOU DESCRIBE HOW THE DS0 IMPAIRMENT TOOL IS ORGANIZED?

A. The DS0 Impairment Tools are a collection of spreadsheet models that calculate the cost associated with connecting a customer's loop that terminates in an incumbent's central office to a CLEC's switch, and the associated customer acquisition costs.

One of the spreadsheets is called the Facility Ring Processor Tool, which determines the transport equipment and facilities that are required to efficiently connect collocation arrangements where unbundled loops are collected back to the CLEC switch. This tool essentially identifies the "backhaul" transport architecture that is needed to establish connectivity between a customer's loop that terminates in the ILEC's central office and a CLEC switch.

The output of the Facility Ring Processor is used as an input to the Transport Cost Analysis Tool. The Transport Cost Analysis Tool calculates the transport cost per DS3 as a function of the number of DS3s active at a Network Node, (a collocation that is connected to a fiber CLEC ring used to provide service to customers) based on the transport network determined by the Facility Ring Processor Tool.[19]

Finally, the cost generated by the Transport Cost Analysis Tool is used as an input to the DS0 Impairment Analysis Tool. In addition to the transport costs, the DS0 Impairment Analysis Tool calculates costs associated with (1) digital loop carrier equipment, (2) collocation, including space and power, (3) interconnection arrangements at the collocation and the CLEC switching office, and (4) the cost of hot cuts. The total of these individual cost components at each wire center, divided by the number of lines a hypothetical efficient CLEC is anticipated to acquire in each wire center, yields the DS0 impairment per line for each wire center which can be and was for this proceeding aggregated into LATA results.

Q. DO THE DS0 IMPAIRMENT TOOLS CALCULATE THE TOTAL COSTS THAT AN EFFICIENT CLEC INCURS TO PROVIDE SERVICE TO A CUSTOMER?

A. No. It is important to emphasize that the DS0 Impairment Analysis Tools quantify only certain significant components of the cost disadvantage that would be faced by a hypothetical efficient CLEC using UNE-L, as compared to the ILEC. The tools do *not* calculate the total cost that would be experienced by a hypothetical efficient CLEC to provide service in Tennessee.[20]

---

[19] A DS3 is equal to 28 DS1s and provides for approximately 45 megabits per second of transport connectivity between two points.

[20] For example, a CLEC's costs to acquire customers are appreciably higher than the costs of the monopoly ILEC, *e.g.*, *TRO* ¶ 471, particularly when the likelihood of price discounting is considered. Likewise, customer-servicing operations become most efficient only when they are used to serve very large customer groups. These factors are considered in connection with a "business case" analysis, as are the costs of the local switching and local transport. Any business

B. Costs of Preparing Loops for Transport Out of the ILEC's Central Offices

Q. WHAT COSTS WOULD A CLEC INCUR TO PREPARE CUSTOMER LOOPS FOR TRANSPORT OUT OF THE ILEC CENTRAL OFFICES?

A. As noted earlier, there are two major components of the cost of preparing the signal, *i.e.*, (1) the cost of DLC and related equipment housed within the ILEC's central office (together with associated equipment at the CLEC's central office) used to digitize, concentrate and multiplex the signals on the CLEC's customers' loops, and (2) the CLEC's cost to obtain collocation space in the ILEC's central office in which to place the DLC and related equipment.

Q. COULD YOU DESCRIBE THE TYPES OF EQUIPMENT THAT THE CLEC MUST DEPLOY TO TRANSPORT THE CUSTOMER'S LOOP OUT OF THE ILEC'S CENTRAL OFFICE?

A. The three main types of equipment required by a CLEC to provide voice grade services using UNE-L are: (1) digital loop carrier (DLC) equipment, *i.e.*, the equipment necessary to digitize, multiplex and concentrate the traffic on individual voice grade loops at the originating ILEC central office, and the corresponding equipment at the location of the CLEC switch; (2) facility terminating equipment, *i.e.*, the cross-connection frames within the CLEC's collocation facilities in each ILEC central office on which the incoming voice grade loops terminate, the out-going transport facilities terminate, and equipment cross-connections are made; and (3) supporting infrastructure equipment, *e.g.*, the

---

case analysis must take into account the implications of providing local switching and transport to both enterprise and mass market customers, and the benefits the CLEC might realize from deploying fewer, larger switches relative to the ILEC.

battery distribution fuse bay and test equipment, that the CLEC must install in order to make its collocated facilities operational.

1. DLC Infrastructure and Facility Terminating Equipment

Q. DOES THE COST FOR DLC EQUIPMENT VARY BY GEOGRAPHIC LOCATION?

A. Because DLC and related equipment can be purchased on the open market, its cost is the same regardless of the geographic area being served. However, the cost per line for providing such equipment varies significantly as a function of the number of customers actually served out of a given central office. For example, the cost of the collocation in an ILEC central office which the equipment is housed *does* vary by state and incumbent LEC (but typically does not vary by specific central office for comparable configurations). The DS0 Impairment Tools take these characteristics into account.

Q. HOW DOES THE DS0 IMPAIRMENT TOOL SIZE THE DLC AND SUPPORTING INFRASTRUCTURE EQUIPMENT?

A. At a high level, the DS0 Impairment Analysis Tool sizes the required DLC and supporting infrastructure based upon the number of lines the CLEC will serve out of a given central office. For each central office, the tool selects the lowest cost investment option from among three differently sized DLC alternatives. Because the frame space required to house the DLC modules and common units is also known, the DLC frame requirements are calculated for each central office, depending upon the DLC alternative selected.

Q. IS THIS SAME METHOD USED FOR SIZING FACILITY TERMINATING EQUIPMENT?

A. Yes. A similar approach is used to establish the number of cross-connection panels (and corresponding frames required) to provide a connection between the ILEC's MDF and the DLC equipment in the CLEC's collocation area for each line acquired in a central office by the CLEC. Each cross-connection panel has a known capacity of the number of voice lines that can terminate on the panel and each panel consumes a specific amount of frame space. Thus, by knowing the number of lines served (which determines the number of terminations), the number of required cross-connection panels can be calculated; and knowing the number of cross-connection panels determines the number of frames required.

Once the quantity of DLC equipment items required in an ILEC central office is determined (*i.e.*, DLC modules, common units and line cards, and termination panels and frames) – and the installed unit costs are calculated – the tools quantify the gross investment in the infrastructure investment needed for voice grade lines for each central office.

Q. IS THE INVESTMENT FOR DLC AND DLC EQUIPMENT SIZED FOR THE ULTIMATE CUSTOMER DEMAND THE EFFICIENT CLEC IS EXPECTED TO SERVE?

A. No, not for all the equipment. The DLC calculations incorporate the effects of a "ramp up" to reflect the fact that a CLEC would not acquire all of its customers instantaneously. The DLC common equipment is sized to meet ultimate demand (*i.e.*, the tools select the particular DLC alternative, and the corresponding cross-connect panels and frames, based on the *final* CLEC market share and line count assumed in the study).[21] However, due to the size and variable nature of line card[22] investment, the tools incorporate the line card investment only as to the demand sufficient to serve the initial customers that the CLEC acquires.[23] The "ramp up" adjustment reflects the fact that common equipment that must be installed on day one is recovered over a smaller number of customers in the earlier period than in latter periods. In addition, it provides for a sizeable deferral of the line card investments to future periods.

Q. DO THE DS0 IMPAIRMENT TOOLS CALCULATE THE COSTS FOR ANCILLARY DC POWER EQUIPMENT REQUIRED TO OPERATE THE DLC EQUIPMENT?

A. Yes. Ancillary power equipment such DC power distribution equipment (sometimes referred to as a mini-battery distribution fuse bay or mini-BDFB) is also included in the support infrastructure investment. The CLEC's choice to install this equipment within its collocation arrangements allows the CLEC to further divide the power (*e.g.*, from one 60 amp circuit to two 30 amp circuits) and thereby gain flexibility and potentially minimize the need for subsequent (and costly) power augments as the CLEC's customer base increases. Therefore, the tools allow power distribution equipment to be added to the CLEC's collocation arrangement.

---

[21] It is economically prudent to initially install the type of DLC common units that will ultimately be required, rather than to start with smaller units and then replace them with larger ones over time.

[22] The line cards are installed in the collocated DLC equipment to actually terminate the unbundled loops into the equipment that will allow for the backhaul to the CLEC's switch.

[23] The tools incorporate a demand "ramp-up" profile that reflects that general experience of new market entry. That is, demand is initially zero, it increases to close to the ultimate level in the first few years and then remains flat for the remainder of the 10-year study period.

2. Collocation Costs

Q. WHERE DOES THE CLEC HOUSE THE DLC AND RELATED EQUIPMENT?

A. Before a CLEC can deploy the equipment required to prepare a loop for transport, it must rent collocation space from BellSouth, in each BellSouth central office where it seeks to provide service. The minimum amount of floor space, including a wide range of collocation elements such as interconnection arrangements based on the particular equipment needs described previously, are computed for each wire center in Tennessee.

Q. HOW ARE THESE COLLOCATION COSTS DETERMINED?

A. Collocation cost is principally a function of the amount of space, cross-connections and power required to provide the backhaul functionality. Because the number of frames required in a central office is developed in the analysis above, and because the average floor space required by a frame is known, the minimum amount of collocation space required in the central office can be calculated. In addition, since the type of DLC and the number of lines served are known, the DC power requirements at the office can be established.

Q. WHAT SOURCE DOES THE DS0 IMPAIRMENT TOOL RELY UPON FOR THE COLLOCATION RATES?

A. The source data for the DS0 Impairment Analysis Tools includes the prevailing collocation rates, by type of collocation, for BellSouth in Tennessee. The tools use current collocation charges for BellSouth for the following components, established by the Tennessee Regulatory Authority, to build bottom-up collocation costs for each BellSouth central office that is used to provide service to mass-market customers in Tennessee:

- AC and DC power Cost
- Space occupancy
- Space construction
- Administrative charges
- DS0 connectivity
- Fiber Entrance Facilities

The DS0 Impairment Analysis Tools establishes the collocation costs for each affected central office by applying the state established costs to the equipment space, power and cross-connection requirements of the particular central office (calculated as described above). ILEC collocation charges, both recurring and non-recurring, are calculated on the basis of common collocation measurement units (*e.g.*, square feet of space, DC amps required, and 2-wire cross-connections), and then multiplied by the collocation rate per unit for each central office. If the ILEC requires a CLEC to purchase a minimum block of capacity (such as minimum costs for cage construction, power feeds and/or cable terminations), then the minimum block size just sufficient to address the equipment deployed in the specific office is determined and used in the cost calculation.[24]

For example, DC power charges are based upon the number and size (maximum capacity) of the power feeds and a per amp charge multiplied by the total amps. The DC power computation is based on the calculated power consumption of the required equipment and appropriate BellSouth tariff rates. The tools also include the capability to match the projected equipment power requirement to the basis upon which the incumbent charges are applied. For nodes, the DS0 backhaul is

[24] Because the number of required frames is known, as is the typical "footprint" of each frame, then the total square footage requirement can be determined.

assigned only the proportion of the cost for DC power that is actually required by the equipment deployed. This approach is taken for nodes in that the service to enterprise customers is assumed to consume all existing power (or space, depending on the element being evaluated) not required for the DS0 infrastructure. For satellites, however, the primary purpose for establishing the collocation arrangement is to interconnect with unbundled loops. As such, for these central office collocations, the entire cost for an appropriate sized collocation arrangement (including the cost for DC power) is assigned to the DS0 backhaul.

Q. HOW DOES THE DS0 IMPAIRMENT TOOL DETERMINE THE AMOUNT OF COLLOCATION SPACE THAT IS NEEDED FOR THE EQUIPMENT?

A. The space occupancy and construction charges generally reflect minimum standard sizes and additional incremental blocks of space. Once the relevant charges are selected, the DS0 Impairment Analysis Tools use the actual square footage needed at that central office to compute the relevant costs.[25] The DS0 Impairment Tools calculates the total number of frames deployed (for DLC, termination equipment, and test equipment) and multiplies the total frame count by user-adjustable inputs for the floor space required by each of the different types of frames. The resulting square footage is the minimum amount of collocation space required to serve the anticipated efficient hypothetical CLEC market share at each ILEC central office. The tool effectively calculates the cost

[25] In order to account for all possible variations in ILEC tariff structures, the collocation section of the DS0 Impairment Analysis tool employs a series of logical formulas and lookup tables to select the appropriate collocation charges.

of collocation for space requirements running from zero to 300 square feet in one square foot increments, based upon the charges contained within BellSouth's approved collocation appendix and the increments of space where the charges change. The tool selects the minimum cost alternative given the amount of space required.[26]

Q. HOW DOES THE DS0 IMPAIRMENT TOOL DETERMINE THE COLLOCATION CHARGES FOR LOOP CONNECTIVITY?

A. Connectivity charges are computed separately at the Voice Grade, DS1, or DS3 level or for fiber (depending on the type of transport deployed). The incumbent charges a CLEC to physically cross-connect transport facilities to the CLEC equipment in the collocation. This specific CLEC equipment allows the customer loop to be transported from the ILEC central office back to where the CLEC's switch is located. If leased transport is employed, the cross-connection is at the DS1 or DS3 level. The costs may also include the cost of a cable from the CLEC's collocation to an intermediate cross-connection frame in the ILEC space where the ILEC actually makes its cross-connection.[27] Even when self-provided

26 For example, an ILEC may offer minimum initial purchases of 100, 200, and 300 square feet. Additional increments may be in 25 square foot increments. If 137 square feet were required in an office, the tool would check to determine if a 150 square foot cage (100 initial + two 25 square foot increments), a 200 square foot or a 300 square foot cage represents the lowest total cost. Regardless of the actual size, the lowest cost alternative is selected.

27 In a similar manner, charges may apply (in addition to hot cut charges) to install and terminate wire cables between the CLEC collocation and an intermediate frame in ILEC space, where a second cable to the MDF is also terminated. These connections represent pre-wiring to the MDF necessary for the CLEC to access voice grade loops. Tariff charges (in addition to the hot cut charges) may apply to install and terminate cables between the CLEC collocation and an intermediate frame in ILEC space where the ILEC's cable (generally to the MDF (for loop) or a transport frame (for interoffice connections) terminate and a cross-connection is made. If tariff charges exist, they are utilized by the model. On the other hand, if the cables must be installed by an ILEC-certified contractor (*i.e.*, no tariff charge exists but a cost is incurred), the average installed cost of an appropriately sized cable is included.

transport is employed, charges may apply to cross-connect fiber running from the CLEC facility in the street outside the office to the CLEC's collocation space within the central office (commonly referred to as a collocation Entrance Facility).

In general, connectivity charges apply based upon one or more of the following categories: per termination, per block of terminations or conductors, and/or per cable. The tool determines, based upon the number and type of backhaul facilities and the number of customer loops served (and inputs regarding maximum cable sizes), the quantity of each category needed based upon the conditions in each central office out of which the CLEC serves its customers. To the extent that an ILEC does not impose charges for a particular category, the unit price is zero.

Q. ARE THE COLLOCATION COSTS ADJUSTED TO ACCOUNT FOR THE PREVIOUSLY-DESCRIBED "RAMP UP" IN THE NUMBER OF CUSTOMERS AN EFFICIENT CLEC WOULD ULTIMATELY SERVE?

A. Yes. Like the DLC calculations described above, collocation costs associated with DC Power consumption are adjusted to incorporate the effect of a "ramp up" that reflects the fact that an efficient CLEC would not acquire all of its customers instantaneously. For example, power feed related charges are incurred immediately based on the maximum expected lines in service, and collocation space construction is based on the projected number of frames, rather than incrementally as each frame is added. Collocation costs which are not incurred on day one, but only as demand materializes, are treated similar to the line-card investment portion of total DLC investment as described above. In addition, collocation amperage-related charges (including HVAC) as well as DS0 termination charges are incurred only as actual demand materializes, and these receive the same treatment as DLC line cards.

C. Costs of Connecting the Customer's Loop to the CLEC's Switch (Backhaul Infrastructure)

1. Facility Ring Processor Tool

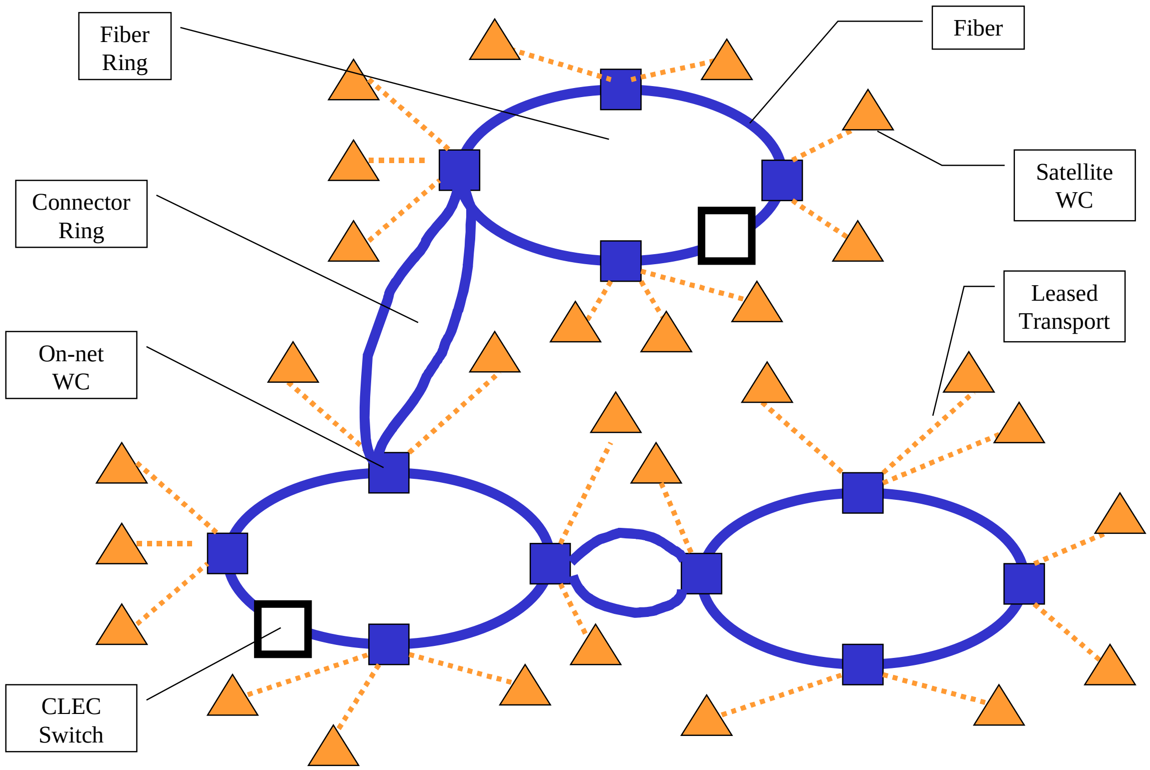
Q. HOW DO THE DS0 IMPAIRMENT TOOLS CALCULATE THE LEVEL OF COST IMPAIRMENT ASSOCIATED WITH BACKHAULING A CUSTOMER'S LOOP FROM AN ILEC CENTRAL OFFICE TO THE CLEC SWITCH?

A. The Facility Ring Processor Tool ("FRP") initially establishes a self-provided CLEC facility network that is linked to the largest ILEC central offices. The CLEC's collocations at those wire centers form the "nodes" of its transport facilities. Each remaining wire center to be served is considered as a satellite location and is then "homed" to the closest node location that is on the CLEC network or "on-net". This process creates the basic backhaul transport network.

Q. CAN YOU PROVIDE A BRIEF DESCRIPTION OF THE FRP TOOL?

A. Yes. The following diagram displays the basic architecture the FRP Tool uses:

Figure 2



The facility architecture designed by the FRP Tool requires the designation of central offices in Tennessee as either Network Nodes (or "core" offices) or Satellite offices. The FRP Tool will connect each network node to another network node using self-provided facilities (nodes connected to at least two other nodes), and "Satellite offices" are connected to the closet node office using facilities leased from the incumbent. As a default mechanism, the FRP ranks all wire centers in Tennessee by number of lines, and then assigns wire centers in declining line count order as Network Nodes until 50 percent of lines have been assigned to nodes. Generally, this mechanism designates approximately 30 percent of the central offices as Network Nodes. However, the user can change the default mechanism or change the designation of any individual node.

Once the Network Node offices are identified, the FRP tool treats all of the incumbent central offices that are *not* designated as node office locations as Satellite offices. The tool separately assigns each Satellite location to its nearest Network Node location.

The FRP tool combines multiple individual physical rings to connect all of the Network Nodes, with each ring serving up to the user-specified maximum number of Network Nodes. The tool uses "ring connectors" to interconnect adjacent rings.[28] An algorithm (written in Visual Basic for Applications code) determines the mix of rings and ring connectors.

Q. HOW DOES THE FRP CALCULATE THE MILEAGE BETWEEN NODES?

A. The FRP tool calculates the mileage (airline and rectilinear) between all Network Nodes in a particular study area, and separately calculates the average miles (airline and rectilinear) per node within the study area.[29] The node-to-node connections are based on a ring architecture that uses SONET rings self-deployed by the CLEC to connect all CLEC node offices. The mileage of fiber that is calculated for a particular SONET ring in the FRP is developed using an algorithm that minimizes the amount of fiber deployed but also accounts for the engineering reality that SONET rings are limited in the number of nodes that can be placed on a particular physical ring and the maximum distance that can exist

28 "Ring connectors" are effectively two-node rings that connect adjacent rings to one another.

29 The mileage calculation is based upon the vertical and horizontal coordinates of the paris of network nodes.

between any two nodes. The details of this calculation can be found in the Technical Appendix.

Similar calculations are made for the ring connector distances. Based on these distance calculations, the FRP tool determines where fiber signal "regenerators" (used to "boost" the fiber signal after a certain distance) are required (using the user-specified regenerator spacing input) for rings and ring connectors.

As noted earlier, the FRP tool also "homes" each Satellite location to the nearest Network Node location. The fundamental assumption in the FRP tool is that Satellite offices will connect to nodes using incumbent-supplied interoffice transport (*i.e.*, special access). Because BellSouth's charges for these types of connectivity are based upon airline distance, the FRP tool determines the closest Network Node to each particular Satellite office on the basis of airline distance. Airline distance is the shortest distance between a satellite and the closest node to that satellite (referred to in tariffs as interoffice transport or special access as "airline mileage"). This distance is used subsequently to determine pricing of incumbent supplied transport (*i.e.*, interoffice transport) in the calculation of backhaul costs in the DS0 Impairment Analysis tool.

2. Transport Cost Analysis Tool

Q. HOW DO THE FACILITY RING PROCESSOR TOOL AND TRANSPORT COST ANALYSIS TOOL RELATE TO ONE ANOTHER?

A. The mileage calculated by the Facility Ring Processor Tool is used as an input to the Transport Cost Analysis Tool to develop the costs of actually constructing or leasing that network.

Q. DOES THE TRANSPORT COST ANALYSIS TOOL DETERMINE THE COSTS TO CONNECT AND OPERATE THE NODES AND SATELLITES?

A. Yes. Satellite-to-node connections are leased facilities from the ILEC and their cost is a function of the established airline distance between those locations which is established by the FRP tool. The SONET ring fiber mileage (referred to as "conductor mileage") that is established in the FRP is used as an input to the Transport Cost Analysis Tool to calculate the facility costs in much the same manner as occurs in the TELRIC studies for ILEC UNE transport. For node (or on-net) offices, the backhaul cost is the self-provided network cost only which is allocated to a typical DS1 or DS3 that would be served on this self-provided network. It is important to understand that this allocation is another of the conservative assumptions made within the model in that the implicit assumption is that the SONET rings built between the nodes will be used for more than just the backhaul of customer loops. As such, by calculating the average cost of a DS1 or DS3 on the self-provided network, this cost will be attributed to the backhaul of customer loops terminating at node collocations assuming that other DS1s or DS3s on the same self-provided network are bearing their share of the network's cost from other enterprise applications. The number and size (DS1 or DS3) of transport required is based on the actual lines being served out of a node collocation.

After the tool has completed the cost development for the "node" locations in the study area, it is necessary to develop the transport cost for "satellite" locations. As noted previously, satellite locations are central offices where the CLEC will need to obtain the customer's unbundled loop, but will not have a fiber network extended to the particular office. As such, the tool must determine the unit cost for DS1 and DS3 leased transport for the connections from the satellite locations, which are not on the CLEC SONET fiber rings, to the nearest node locations, which is on the CLEC SONET fiber ring. The airline mileage between the node and satellite central offices that is developed in the FRP tool is then used in the Transport Cost Analysis Tool to calculate the DS1 or DS3 transport cost using the relevant BellSouth rates for a DS1 connection and a DS3 connection. As with node locations, the actual selection of whether a DS1 connection or a DS3 connection is used is based on the number of unbundled loops that the CLEC expects to serve within a central office. There are specific calculations that take account of the functionality of the DLC that are also used to identify the specific number and size (DS1 or DS3) of connections that are required between the DLC at the satellite central office and the nearest node, but the underlying driver of this determination is the number of lines that the CLEC anticipates serving at the satellite central office. Based on the number and size (DS1 or DS3) of the connections and the mileage between the satellite central office and nearest node central office, the total transport cost calculation for this pair of offices can be made. This same set of calculations is repeated for each satellite central office contained within the study area. For satellite locations, the backhaul cost is the combination of the leased facility cost to the node location and the self-provided transport from the node location to the CLEC switch.[30]

[30] On-net self-provided network transport costs must be included so that the loops may ultimately be

When special access tariffs are used to determine the pricing of such facilities, it may also require knowledge of the specific offices connected, in order to determine whether price cap or pricing flexibility tariffs apply. All these preceding factors are taken into account by the tools' calculations.

Q. EARLIER YOU BRIEFLY DISCUSSED THAT THE ALLOCATION OF THE COSTS FOR THE SONET NETWORKS IS PERFORMED BASED ON THE EXISTENCE OF OTHER SERVICES SHARING THE SAME NETWORK. COULD YOU DESCRIBE THIS ALLOCATION IN MORE DETAIL?

A. Yes. As I noted earlier, such a CLEC self-provided SONET transport infrastructure would rarely if ever be built to handle exclusively transport traffic generated only by mass market customers. In recognition of this fact, the Transport Cost Analysis Tool assumes that there would also be significant enterprise customer traffic moving between Network Node locations on the transport ring.

The Transport Cost Analysis Tool gives effect to this assumption by employing a "utilization" or "fill" factor that effectively allocates the total costs of the self-provided SONET network structure and optical equipment required by the OC-48 ring built to connect all Network Nodes in a study area as follows:

$$\text{Average Cost of Back-Haul per DS3 per Node} = \frac{\text{Total Cost of OC-48 Network}}{\text{48 DS3s per OC-48} * 80\%}$$

connected to a CLEC local switch, which is one (or more) of the on-net locations for the self-provided ring network.

Q. HOW WOULD YOUR UTILIZATION BE AFFECTED IF MORE NODES WERE ADDED TO THE NETWORK?

A. Quite simply, the addition of more nodes to the SONET network would cause the utilization level to drop. The precise mechanics of this relationship have not been modeled because it is not possible to know all of the enterprise demand that would exist between the nodes on the SONET network. However, utilization is not a static assumption. If additional nodes were added to the network, these additional nodes on the same SONET rings cause the following to occur: (1) Increase the average cost of back-haul transport per DS3 per mile because more miles of transport have been added to the SONET network to incorporate the additional node; and (2) Decrease the anticipated average utilization of the ring because you would generally be adding nodes with a lower anticipated demand.

D. Costs of Transferring Customers from the ILEC to CLEC Network (Hot Cuts)

Q. THE THIRD MAJOR COMPONENT OF ABSOLUTE CLEC COST DISADVANTAGE YOU IDENTIFIED EARLIER INVOLVES THE COSTS OF TRANSFERRING CUSTOMERS. CAN YOU DESCRIBE HOW THESE COSTS ARE CALCULATED?

A. Yes. The third major component of the CLEC's economic impairment is the costs associated with transitioning customer loops from the ILEC to a CLEC using UNE-L. This customer transfer is referred to in the industry as a "hot cut." The largest component of this cost consists of the charge(s) that BellSouth assesses to transfer each customer's loop from its network facilities to the CLEC's collocation (*i.e.*, the "hot cut" charge). The hot cut cost assessed by BellSouth is a nonrecurring per-line charge imposed on CLECs so they can connect ILEC-supplied loops to CLEC-owned switches.[31]

For Tennessee, BellSouth, for example, today exacts a nonrecurring charge of $102.8, assuming that a coordinated hot cut is employed for a single line order. As the FCC has recognized, charges such as these can "contribute to a significant barrier to entry."[32]

Q. DO HOT CUT COSTS CONSIST ONLY OF THE ILEC IMPOSED COSTS?

A. No. Additional hot cut costs may also include the cost of work that must be performed *internally* by the CLEC in order to accomplish this transfer.[33] Therefore, the DS0 Impairment Analysis tool can include the internal CLEC's costs to manage hot cuts in addition to the charges assessed by the incumbent. The average hot cut costs per month are a function of customer churn, the calculated "per-line" hot cut charges and the internal costs of the CLEC. If customers that choose a CLEC remained that CLEC's customer forever, the CLEC would incur only a single hot cut cost for each customer that it adds to its network. However, customer behavior in a competitive mass-market would be

31 The hot cut charge may include charges that vary per order and per line on an order (or on a first and additional line basis), with the number of the lines converted for a unique retail customer address typically being the determining factor. As input to the impairment analysis, weighted average costs per line are developed based upon the profile of single and multi-line mass-market customer locations. Separate calculations are made for consumer and business locations.

32 *See* TRO, ¶470.

33 *See, TRO,* ¶*470.* The FCC recognizes not only economic impairment arising from the hot cut process, but also operational issues. *See, TRO,* ¶465, which discusses operational impairments associated with hot cuts.

characterized by significant churn.[34] For this reason, the calculation of the hot cut charges per customer line must be higher to reflect the effects of this churn on total hot cut activity.[35] This is accounted for in the tool by the combination of the CLEC's net growth in lines and its disconnect rate. Thus if the CLEC grows its overall number of lines by five percent in a year, and it also anticipates a five percent disconnect rate, its hot cut expenses in that year would be the hot cuts associated with the five percent net line growth *plus* the hot cuts associated with replacing the five percent of lines that would otherwise be lost, *i.e.*, a total of 10 percent of the lines in that year would experience a hot cut.

V. TOTAL CLEC DS0 COST DISADVANTAGE

Q. PLEASE SUMMARIZE THE DS0 COST DISADVANTAGE YOU HAVE DEVELOPED FROM THE DS0 IMPAIRMENT ANALYSIS TOOLS.

A. As indicated in the previous discussion, the DS0 Impairment Analysis Tools rely upon specified inputs for each of the calculations leading to the total cost disadvantage faced by a CLEC entering the mass market. Overall, these inputs are conservative because (1) they focus only on major components of impairment and ignore other sources of impairment, (2) assume enterprise customers will defray a significant proportion of the costs of back-haul transport and collocation, and (3) ignore many of the costs that a hypothetical efficient CLEC would spend to effectuate customer acquisition.

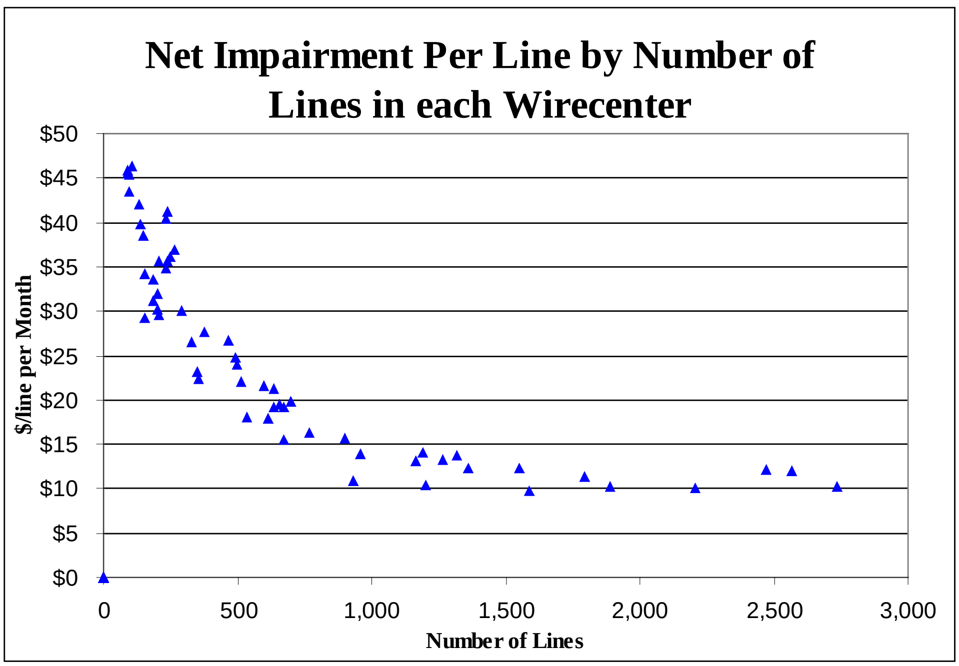
---

[34] For example, the default churn rate employed is 4.6 percent per month. *See* Banc of America Securities, April 30, 2003, page 10.

[35] *See, e.g.*, TRO ¶ 471: "The evidence in the record demonstrates that customer churn exacerbates the operational and economic barriers to serving mass market customers."

The results of my study, by geographic market, are summarized in the tables set forth below. Market-specific details, including inputs, are shown on Exhibit SET-3.

The lowest average impairment for any Tennessee LATA is $17.98 (for LATA 470). The following graph depicts the total impairment per line for each wire center within that LATA. It demonstrates that the impairment increases rapidly as the number of lines served in an office declines.



Based on the average impairment for LATA 470 (the largest LATA in Tennessee) my analysis shows that CLECs would experience an average cost disadvantage of $17.98 if UNE-L had to be used to serve mass-market customers.

The conclusion is inescapable that cost impairment in the form of an absolute cost disadvantage of this magnitude to the CLEC – and corresponding cost umbrella for the ILEC – constitutes a clear barrier to entry.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes it does.

BEFORE THE TENNESSEE REGULATORY AUTHORITY

NASHVILLE, TENNESSEE

IN RE:

IMPLEMENTATION OF THE FEDERAL	**)**	
COMMUNICATIONS COMMISSION'S	**)**	**DOCKET NO.**
TRIENNIAL REVIEW ORDER – 9 MONTH	**)**	**03-00491**
PROCEEDING MASS MARKET SWITCHING	**)**	

DIRECT TESTIMONY OF MARK DAVID VAN DE WATER

ON BEHALF OF

AT&T COMMUNICATIONS OF THE SOUTH CENTRAL STATES, LLC

JANUARY 16, 2004

Public Version

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Mark David Van de Water. My business address is 7300 East Hampton Avenue, Room 1102, Mesa, AZ, 85208-3373.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND WORK EXPERIENCE IN THE TELECOMMUNICATIONS INDUSTRY.

A. I hold a Bachelors of Arts in Psychology and a Masters of Arts in Organizational Management. I am employed by AT&T, operating in Tennessee as AT&T of the South Central States, LLC ("AT&T"). For the past 5 years I have worked in the Local Services and Access Management organization of AT&T with responsibility for negotiating and implementing operational support system ("OSS") requirements and interfaces, and for resolving operational issues between AT&T Local Services and Southwestern Bell Corporation ("SBC"). In particular, I participated with SBC in formalizing their documented coordinated and uncoordinated unbundled network element-loop ("UNE-L") with local number portability ("LNP") hot cut processes. During 2003, I negotiated with SBC, on a business-to-business basis, to create a process by which AT&T is able to convert multiple unbundled network element-platform ("UNE-P") customers to UNE-L. A trial is currently being conducted of this process. Further, this process is the foundation of SBC's current "batch" hot cut proposal presented throughout its 13-state region. Before this assignment, I worked for over 16 years at Western Electric Company in various positions.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE REGULATORY COMMISSIONS?

A. Yes. I have testified before the California, Kansas, Missouri, Illinois, and Texas commissions in matters related to SBC's applications for in-region long distance authority under Section 271 of the Federal Telecommunications Act of 1996.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to address the operational and economic constraints associated with the hot cut process and other key operational issues likely to impair CLECs in the absence of unbundled switches. My testimony covers three key areas in this proceeding.

First, I address the operational and economic barriers presented by the hot cut process. This section of my testimony explains the findings of the Federal Communications Commission ("FCC") in the Triennial Review Order ("TRO").[1] It summarizes the FCC's conclusions that competitive carriers are impaired without access to unbundled local switching as a result of economic and operational impairment due to the hot cut process.

Second, I describe the specifics of the current hot cut process and AT&T's experience with hot cuts in the BellSouth region. My testimony summarizes why AT&T's experience led it to choose UNE-P to provide local service and describes specific concerns related to BellSouth's performance of hot cuts.

Third, I describe the challenges that must be addressed in implementing any manual loop migration process. I address the volume of hot cuts that will be required and the evaluation standards by which any loop migration process should be considered. My testimony discusses the number of UNE-L hot cuts that should be expected if unbundled local switching is no longer available and the segments of the market that pose unique challenges for mass market loop migrations. My testimony also addresses new operational constraints that will arise if customer conversions require migration of a loop because

[1] *Report and Order and Order on Remand and Further Notice of Proposed Rulemaking*, In the matter of Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, Federal Communications Commission, CC Docket No. 01-338, Released August 21, 2003 (hereafter referred to as the "Triennial Review Order" or "TRO")

unbundled local switching is no longer available to Competitive Local Exchange Carriers ("CLECs").

I. BACKGROUND: THE OPERATIONAL AND ECONOMIC BARRIERS PRESENTED BY THE CURRENT HOT CUT PROCESS

Q. WHAT IS A HOT CUT?

A. When a mass-market (residential and small business) customer seeks to move his or her local service from one switch-based carrier to another, the connection between the customer's analog loop and the original carrier's switch must be broken and a new connection must be established between that analog loop and the new carrier's switch. Because the customer's loop is lifted or "cut" while it still provides active service to a customer (i.e., the loop is "hot"), the process used to transfer analog loops has become known as a "hot cut." The hot cut process involves two separate changes to the customer's service that must be coordinated to occur at approximately the same time: (1) the manual transfer of the customer's analog loop from one carrier's network to another's (the loop cut); and (2) the porting of the customer's telephone number (including the associated software changes and the disconnection of the original carrier's switch translations), so that inbound calls to the customer can be routed to the new carrier's switch using the customer's existing telephone number.

Q. DOES A HOT CUT CAUSE THE CUSTOMER TO LOSE SERVICE?

A. Yes. This occurs in two ways. The first is a complete loss of dial tone. From the time the customer's analog loop is disconnected from the ILEC's switch until it is reconnected to the CLEC's switch, the customer has no dial tone and is completely out of service. Second, from the time the customer's analog loop is reconnected to the CLEC's switch until the customer's number is successfully ported to the CLEC's switch, the customer cannot receive any incoming calls. That is because, until the appropriate change message is received by the Number Portability Administration Center ("NPAC"), the NPAC database indicates that calls should be routed to the ILEC's switch. If someone calls the customer and the calls are sent to the ILEC's switch after the customer's analog loop has been physically moved, the call will not complete and the caller will be unable to reach the customer.

Q. HOW DID THE FCC ADDRESS THE ISSUE OF HOT CUTS?

A. In short, it concluded that hot cuts cause impairment. In the TRO**,** the FCC reviewed substantial data and descriptions of this hot cut process provided by both ILECs and CLECs and found, on a national basis, that competing carriers providing voice service to mass market customers are impaired without access to unbundled local circuit switching. TRO ¶ 459. This finding was based in part on clear evidence regarding the economic and operational barriers caused by the hot cut process. *Id*. *See also* ¶ 473 ("Our national finding of impairment is based on the combined effect of all aspects of the hot cut process on competitors' ability to serve mass market voice customers.") The FCC recognized that "whether a customer was previously being served by the competitive LEC using unbundled local circuit switching [i.e., using UNE-P], or by the incumbent itself, a hot cut must be performed" [if unbundled local switching is no longer available]. *Id*.¶ 465.

Q. DID THE FCC MAKE SPECIFIC FINDINGS?

A. Yes. The FCC found:

> "[H]ot cuts frequently lead to provisioning delays and service outages, and are often priced at rates that prohibit facilities-based competition for the mass market. The barriers associated with the manual hot cut process are directly associated with incumbent LECs' historical local

> monopoly, and thus go beyond the burdens universally associated with competitive entry. Specifically, the incumbent LECs' networks were designed for use in a single carrier, non-competitive environment…" Id. ¶ 465.[2]

The FCC recognized that, as a result, "for the incumbent, connecting or disconnecting a customer is generally merely a matter of a software change. In contrast, a competitive carrier must overcome the economic and operational barriers associated with manual hot cuts." *Id* . (citations omitted).

Upon review of the evidence, the FCC concluded that the economic and operational barriers of the hot cut process include "the associated non-recurring costs, the potential for disruption of service to the customer, and our conclusion, as demonstrated by the record, that incumbent LECs appear unable to handle the necessary volume of migrations to support competitive switching in the absence of unbundled switching." *Id*. ¶ 459. The FCC further concluded that "[t]hese hot cut barriers not only make it uneconomic for competitive LECs to self-deploy switches specifically to serve the mass market, but also hinder competitive carriers' ability to serve mass market customers using switches self-deployed to serve enterprise customers." *Id.*

II. <u>OPERATIONAL AND ECONOMIC IMPACTS WHEN USING UNBUNDLED LOOPS: WHY AT&T USES UNE-P RATHER THAN UNBUNDLED LOOPS</u>

Q. HOW IS AT&T CURRENTLY SERVING MASS MARKET CUSTOMERS IN BELLSOUTH TERRITORY?

A. AT&T is currently acquiring virtually all of its mass market (residential and small business) customers using the Unbundled Network Element Platform ("UNE-P"). For example, from January through June 2003, BellSouth has only completed *** Begin

---

[2] For a full discussion of the impairments created by the incumbents' current network architecture, see the Direct Testimony of AT&T Witness Jay Bradbury.

Confidential [redacted] End Confidential *** hot cut orders for AT&T for the entire nine-state BellSouth region. Below are the numbers of hot cut orders by month and the number of UNE-P orders per month.

*** Begin Confidential

Month	UNE-P Orders	Hot Cut Orders
January, 2003	[redacted]	[redacted]
February, 2003	[redacted]	[redacted]
March, 2003	[redacted]	[redacted]
April, 2003	[redacted]	[redacted]
May, 2003	[redacted]	[redacted]
June, 2003	[redacted]	[redacted]

From BellSouth's BellSouth Performance Measurement and Analysis Platform ("PMAP')

End Confidential ***

Further, according to PMAP's Customer Trouble Report Rate reports, as of November 2003, while AT&T had under *** Begin Confidential [redacted] End Confidential ***UNE-L lines in service in BellSouth territory, it had over *** Begin Confidential [redacted] End Confidential ***UNE-P lines in service.

Q. HAS AT&T USED METHODS OTHER THAN UNE-P TO PROVIDE SERVICE TO MASS MARKET CUSTOMERS?

A. Yes. As noted above, AT&T has served a limited portion of the small business market using an unbundled loop from BellSouth with an AT&T owned switch using the hot cut process. Significant cost and operational provisioning problems that occurred even at these low volumes of hot cuts, however, caused AT&T to virtually eliminate UNE-L as a means of acquiring customers.

Q. DID AT&T EXPERIENCE THE HOT CUT IMPAIRMENTS FOUND BY THE FCC?

A. Yes. As confirmed by the FCC, AT&T's experience was that the hot cut process frequently led to provisioning delays and service outages that led to an untenable level of customer dissatisfaction. Naturally, this dissatisfaction was directed at AT&T as the retail provider of the service, not BellSouth, the underlying wholesale provider. In particular, BellSouth's provisioning delays included its substandard performance in returning timely firm order confirmations, its failure to provide a reliable schedule for performing hot cuts, and its failure to notify AT&T consistently and timely that customer loops had been transferred to AT&T, so that AT&T could complete the final steps necessary to port the customer's telephone number to ensure the customer could receive incoming calls.[3] Factors that contributed to customer service outages included BellSouth's erroneous disconnection of end users' lines and, when erroneous disconnections occurred, undue delay in reconnection. In addition, BellSouth's high charges for hot cuts make facilities-based competition using UNE-L for mass market customers uneconomic.

Q. GIVEN THESE PROBLEMS, WHY DOES AT&T CONTINUE TO USE HOT CUTS AT ALL?

A. AT&T has existing business customers that it serves using its own switch and unbundled analog loops dating back to the time when AT&T was using UNE-L to provide local service. When these customers wish to change their service by adding lines or migrating additional lines from the ILEC, AT&T will continue to use UNE-L to satisfy this request. Additionally, when a large customer migrates more lines to AT&T than can be

[3] Timely firm order confirmations are essential to communicate when the order is to be provisioned so that number porting activities can began and service migration can be confirmed with the customer. Late firm order confirmations also cause the customer's order to be delayed past the times originally requested by the customer.

provisioned on a single DS1, but less than can economically be provisioned on two DS1's, AT&T will provide service to this customer by using a DS1 loop, and unbundled analog loops for the additional lines that could not be supported on the DS1.

AT&T follows this practice because it maintains separate processes and databases for its customers served via loop facilities and its customers served via UNE-P. Having all of a customer's lines provisioned using the same network configuration allows AT&T to provide more efficient and effective on-going customer service, maintenance, and repair. AT&T does not actively market analog services to small business mass market customers using a UNE-L strategy, due to the provisioning problems and the high costs of hot cuts and backhaul costs, *i.e.*, the costs of extending the loop from the ILEC central office to AT&T's switch.

Q. HOW DOES THE HOT CUT PROCESS DIFFER FROM PROVIDING SERVICE USING UNE-P?

A. UNE-P is a simple process that is ordered and provisioned electronically. With UNE-P, there should be no need to perform physical work in the ILEC's central office or outside loop plant to migrate an existing ILEC customer to a CLEC that is providing service using UNE-P. The migration from ILEC-retail to CLEC-UNE-P service only requires the ILEC to perform software changes. Thus, there is little chance for error and the customer does not have to lose service during the migration, because the service, both before and after the change, is being provided through the use of the ILEC's switch. This eliminates the need for a physical transfer of the customer's loop, as well as the need to port the customer's telephone number to another switch. Consequently, this service is almost always provided to the customer very quickly.

A hot cut, in sharp contrast, is a complex, highly manual process. It requires significant coordination between both the ILEC and a CLEC. Both carriers must perform multiple tasks in the hot cut ordering and provisioning processes, and both parties must coordinate these operations in the proper, agreed-upon sequence. If the many steps of the hot cut process are not performed in that exact sequence -- and properly coordinated between both carriers -- and if the ILEC does not complete its downstream processes correctly and timely, the customer will experience a service outage that is much longer than the unavoidable outage associated with this process.

Q. PLEASE DESCRIBE THE MAJOR STEPS IN MIGRATING A CUSTOMER FROM AN ILEC TO A CLEC USING UNE-P.

A. There are only a few significant steps involved in migrating a mass-market customer from the ILEC to a CLEC using UNE-P:

- After completing the sale to the customer, the CLEC accesses the ILEC's pre-ordering OSS in order to obtain the necessary customer information, such as the correct name and address. A CLEC agent enters this information into the CLEC systems to create the CLEC customer service record and establish the CLEC bill. The agent must take special care to ensure the information used by CLEC matches the ILEC's records in order to avoid an order rejection by the ILEC.
- The CLEC's agent prepares the Local Service Request ("LSR") and submits it electronically to the ILEC interface. The large majority of UNE-P migration orders can be processed by the ILEC without the need for any manual intervention by ILEC personnel. Thus, most UNE-P migration orders electronically flow-through the ILEC's OSS, and can be provisioned on a same day or next day basis.
- Upon receipt of the LSR, the ILEC electronically validates that the order is error-free, and electronically sends the CLEC a Firm Order Confirmation ("FOC").
- Upon receipt of the FOC, the CLEC updates its systems to reflect the due date of the order.
- Thereafter, the remaining processes are electronic. On the due date, which is typically the next day, the ILEC's OSS implement the order by making appropriate software changes that (i) transfer ownership of the account to the CLEC and establish wholesale billing to the CLEC for the customer and (ii) cause

the ILEC's internal systems to send a final retail bill to the end user.

- When the CLEC receives the provisioning completion notice electronically from the ILEC, the CLEC closes out the order in its systems including such items as establishing the customer's new billing arrangement.[4]

For UNE-P, the migration process is electronic with little opportunity for human error. According to BellSouth's Response to AT&T Interrogatory 32 (see Exhibit MDV-1), with UNE-P migrations, over eighty eight percent (88.7%) of orders flowed through completely electronically, eliminating opportunities for human error. However, only twenty nine percent (29.0%) of UNE-L migration orders flowed through. (See BellSouth's response to AT&T Interrogatory No. 28, attached as Exhibit MDV-2). Additionally, there is rarely a service interruption when a customer is migrated to a CLEC using UNE-P. After ordering service from a competitive carrier, the entire customer migration process is completely hidden from the end-user in a manner that makes changing local carriers as seamless as changing long distance carriers. These electronic processes are the rough equivalent of the Primary Inter-exchange Carrier "PIC" process that was developed to support the highly competitive long distance market.

Q. PLEASE DESCRIBE THE ADDITIONAL SIGNIFICANT STEPS OF MIGRATING A CUSTOMER FROM AN ILEC TO A CLEC USING A HOT CUT.

A. When a CLEC seeks to use its own switch to serve mass market local customers using a UNE-L architecture, the processes needed to change local carriers are much more complex, manual and costly than for UNE-P, requiring physical work to transfer the customer's analog loop from one carrier's switch to another's. For example, the CLEC must assign the customer to facilities in its switch and equipment; both the CLEC and the ILEC

[4] If the customer has requested voicemail, the CLEC must also build and test the voice mailbox, if applicable.

must conduct a series of number porting activities; and the ILEC must perform numerous manual provisioning and testing activities in its central office and sometimes in the field. Before the CLEC even submits an order for a hot cut, the CLEC must conduct the following activities in addition to those required for a UNE-P migration:

- The CLEC negotiates a due date with the customer based on the standard intervals for loop migrations that are lengthier than UNE-P intervals. For business customers, a cutover time must also be negotiated to ensure the service outage does not impact the operation of the customer's business.
- The CLEC conducts an inventory of facilities and electronically assigns the customer's loop to specific facilities in the CLEC's switch, to equipment located in CLEC-owned collocation space and to a Connecting Facility Assignment ("CFA") that will be used by the ILEC to connect the customer's loop to the CLEC's collocated equipment.
- The CLEC accesses the ILEC's Loop Facility Assignment Control System ("LFACS") database to confirm that the availability of the CFA information in both companies' databases match.

After completing these activities, the CLEC prepares and submits the LSR. After submission of the LSR, the ILEC begins its activities.

- The ILEC checks its CFA database to ensure the CFA on the order matches its inventory.
- The ILEC issues the number portability "trigger" order by setting switch triggers which will ensure the customer receives intra-switch calls between the period of time the CLEC ports the number to its switch until the ILEC disconnects the telephone number in its switch.
- The ILEC inputs the order into its backend systems to create the internal service orders that will be needed to accomplish the migration.

Then the ILEC returns the FOC to the CLEC. Unlike UNE-P, after receiving the FOC, in a UNE-L migration the CLEC and the ILEC cannot rely on the electronic systems to flawlessly provision the service. Instead, the following complicated set of activities occurs, activities that must be coordinated if the cut is to be successful for the customer:

- The CLEC confirms with the customer the specific time and date when the hot cut is scheduled to take place based on the information in the FOC.
- The CLEC verifies that dial tone is being delivered from its switch to the CFA in the collocation cage.
- The CLEC alerts the National Number Portability Administration Center ("NPAC") that reprogramming is needed to move the customer's telephone number from the ILEC to the CLEC by sending an electronic "create" message to the Administrator. This begins the process of porting the customer's telephone number. This "create" message prompts NPAC to send a message to the ILEC to ensure the ILEC consents. The ILEC has eighteen (18) hours to respond.

After the CLEC completes these activities, the ILEC completes other activities necessary to a hot cut that are not required for a UNE-P conversion.

- The ILEC determines whether the facilities currently being used by the customer can be reused. For example, if the customer is on Integrated Digital Carrier Loop ("IDLC"), the facilities cannot be reused and spare non-IDLC facilities must be identified and assigned to this customer.
- The ILEC pre-wires the cross-connection frames.
- The ILEC confirms the presence of dial tone from the CLEC's switch on the cross-connects in the CLEC's collocation space.
- Upon receipt of the "create" message from NPAC, the ILEC will send a "concur" message back to NPAC.
- The ILEC verifies that the proper phone number is on the loop that is to be cut over.

After these activities, the ILEC contacts the CLEC to determine whether the cut can proceed as scheduled. During this call the ILEC may also provide essential information such as test results. Assuming nothing has gone wrong, on the day of the cut over, the ILEC and the CLEC will continue the following activities:

- The ILEC ensures it has the correct line for the cut.
- The ILEC verifies dial tone on the line at the ILEC Main Distribution Frame ("MDF").
- The ILEC monitors the line and, when idle, removes at the MDF the old cross connection jumper that connected the customer's loop to the ILEC's switch and terminates the pre-wired cross connection from the CLEC's CFA to the customer's loop.

- The ILEC provisioning center contacts the CLEC to advise that the conversion is complete.
- The CLEC then conducts its own tests to ensure that all lines have been successfully migrated.
- If testing is successful, the CLEC sends an "activate" message to NPAC advising that the customer's number should be ported to the CLEC's switch.
- The CLEC then calls the ILEC to accept the service.

The cut, however, is still not complete.

- Upon receipt of the activate message from NPAC, the ILEC completes the disconnect order and sends an "unlock" message for the E911 database administration to allow the CLEC access to the E911 database record for the ported number.
- Then the CLEC migrates the 911 record by updating the Automatic Location Indicator ("ALI") database to identify the CLEC as the local service provider. This ALI information supports the Public Safety Answer Point ("PSAP") that receives 911 calls.
- The ILEC must remove the old cross connections from its frame to free up the ILEC's switch port for another customer.

Only then is the hot cut complete. Not only are there significantly more steps involved in a hot cut, those steps must be coordinated if a cut is to be successful in limiting the time the customer is out of service.

To demonstrate the flow and order of activities, I have attached as Exhibit MDV-3 a process flow document for a hot cut. The first three pages show by numbered tasks the activities the ILEC must conduct to complete a hot cut. Page Four shows by lettered tasks, the activities the CLEC must complete. Beginning with Task A on Page Four, one can follow the flow of the simplest type of error-free hot cut. As the exhibit reveals, the ILEC must conduct at least twenty-three (23) separate tasks and the CLEC must conduct at least twelve (12). These tasks cannot be conducted at the same time but must move forward in a back and forth flow and often must be coordinated with the other party. In addition, I have attached to my testimony as Exhibit MDV-4 a video depicting the extensive changes to the network architecture required to perform the hot cut process, the numerous manual steps involved in the actual hot cut, and an efficient and effective alternative to the manual hot cut process.

Q. HOW DO THESE ADDITIONAL STEPS IMPACT CLECS THAT ATTEMPT TO USE THEIR OWN SWITCHES?

A. First, these additional steps add time. UNE-P orders are completed much more quickly than UNE-L orders. The completion interval for a UNE-P order without any field work is from less than ½ day to less than two days:

Dispatch Type	Volume	Order Interval (excluding FOC Interval)
Switch based Completions	12,482	0.34 days
Central Office Based Completions	2,753	1.64 days

In contrast, the completion interval for UNE-L with LNP orders that do not require field work is as follows:

Loop Type	Volume	Order Interval (excluding FOC Interval)
2 wire analog loop with LNP (designed)	4	5.00 Days
2 wire analog loop with LNP (non-designed)	0	N/A

(See measure P-4, Order Completion Interval--October, 2003 Tennessee Monthly State Summary ("MSS") report)

Second, the multi-step, highly manual UNE-L process introduces numerous opportunities for human error and degradation of service quality. The greater the opportunity for error, the more likely the service migration date may be delayed or changed, which causes customer dissatisfaction with the CLEC. Moreover, introduction of errors also significantly increases the likelihood that the customer may be either completely out of service for an extended period or be unable to receive incoming calls. For example, when customers in Tennessee experience service outages during a hot cut, the average outage duration is as follows: September, 2003-5.08 hours, and October 2003 - 10.24 hours. (See Tenneesee's October, 2003 PMAP Average Recovery Time Measure).

Mass market customers will not accept such delays or errors. As the FCC noted, these customers "*have come to expect the ability to change local service providers in a seamless and rapid manner.*" TRO ¶ 471 (citations omitted) (emphasis added). They "generally demand reliable, easy-to-operate service and trouble-free installation." *Id.* at 467 (citations omitted). Moreover, when troubles occur, end-user customers blame the CLECs. The FCC recognized that "[s]ervice disruptions also will influence customer perceptions of competitive LECs' ability to provide quality service, and thus affect competitive LECs' ability to attract customers." *Id.* at ¶ 466.

These critical service quality concerns and others are reflected in the following table that illustrates the inferior performance BellSouth provides for analog loops compared to UNE-P in Tennessee, obtained from recently BellSouth-reported performance data.

	UNE-P	**Analog Loops/with LNP**
FOCs-% on time	94.71%	Design –40.28 % Non-design –0 %
Actual Flow-Through for migration orders	88.7%	29.0%
% Orders requiring Field Dispatch[5]	2.3%	44%
Non-dispatch Order Completion Intervals	.34 days for switch based 1.64 days for central office	Design 5.00 days Non-design N/A

From October MSS Reports, and Exhibits MDV-1 and MDV-2.

As is depicted above (even with the current minimal UNE-L volumes), far fewer UNE-L orders flow-through and thus more orders have to be handled manually, fewer UNE-

[5] The 2.3% field dispatch for UNE-P is likely to be applicable to new installations only (not migrations), creating an even greater disparity between field dispatch for UNE-P than UNE-L than the data indicate.

L Firm Order Confirmations are returned on time, significantly more UNE-L orders require a field dispatch, and due date intervals are longer for UNE-L than UNE-P. In sum, the enormous increase in physical work in the central office to provision hot cut customers is exacerbated by significantly more manual work and delay in every step of the process.

Third, these additional steps add significant cost. The cost for processing and provisioning a UNE-P order in BellSouth Tennessee is $1.03. In sharp contrast, the cost for most hot cuts in BellSouth Tennessee is $75.06 or $109.35. Similarly, a CLEC's internal costs for UNE-P are significantly less than UNE-L. This is because once the UNE-P orders are submitted, they are tracked electronically and generally do not require individual work. For UNE-L orders, however, the CLEC bears labor costs to prepare, track and implement its orders. As represented more fully in Exhibit MDV-3, these additional CLEC costs include the following work activities: (1) connecting facility assignments ("CFA") inventory management, (2) dial tone and conformance testing, (3) internal pre-cut and day of cut coordination with ILEC, and (4) separate systems and activities required to support number portability. In addition, if the CLEC's customer wants the conversion completed during "non-business" hours in order to avoid service disruption during the time when service is most critical to the customer, the CLEC must pay overtime for any involved personnel. And critically, the CLEC will never recover these costs if the CLEC loses the customer as a result of problems incurred during the hot cut itself, or in situations where the industry is experiencing rapid customer churn. TRO ¶ 471.

Q. WHAT COST DOES AT&T BELIEVE IS APPROPRIATE FOR MIGRATING CUSTOMERS?

A. AT&T believes that the cost for migrating customers among providers must be based on forward-looking technology (electronic) technology, and should be as equitable as possible among types of service migrations. For example, the cost of a PIC change in BellSouth Tennessee is $3.07, and the cost of a migration to UNE-P in BellSouth Tennessee is $1.03. Methods other than electronic provisioning of service migrations lead to discriminatory price differences that are impossible to overcome.

Q. ARE THE OPERATIONAL ISSUES YOU DISCUSS UNIQUE TO BELLSOUTH?

A. No. While, as discussed below, BellSouth has created some unique issues due to its refusal to respond reasonably to requested improvements in its hot cut process, most of the operational barriers inherent in the hot cut process exist simply because it is a burdensome manual process that must be performed on a loop by loop basis. Any manual process, by nature, introduces significant potential for human error. Mistakes such as (1) disconnecting the wrong loop, (2) premature disconnects, (3) cross-connecting the loop to the wrong CFA, (4) inadvertently breaking cross-connection wires on the frame for end-users not involved in the hot cut while connecting the new or disconnecting the old jumper pairs, or (5) making poor connections on the terminal block (*e.g.*, loose wire wraps) all can lead to customer service outages that can be lengthy if the problem goes undetected by the person who made the error. The hot cut process is inherently labor-intensive, inefficient, prone to error, and incapable of sustaining the volumes necessary to allow effective competition in the mass market.

Q. WHY DO YOU SAY THE HOT CUT PROCESS IS INHERENTLY INCAPABLE OF SUSTAINING VOLUMES NECESSARY TO ALLOW EFFECTIVE COMPETITION FOR MASS MARKET CUSTOMERS?

A. The failure and service restoration problems that occur at low volumes will only be exacerbated by the tremendous increase in the level of activity that will be required if unbundled local switching were not available and CLECs are forced to use UNE-L to serve mass market customers. These problems will be further compounded with the number of additional inexperienced people that will be necessary to work the hot cut process and to troubleshoot and repair the increased troubles that are likely to occur. Because the industry as a whole has absolutely no experience providing service to mass market customers using a hot cut process -- or anything remotely comparable to it -- it is impossible to accurately qualify the impact this process will have on service quality. We do know, however, that service quality is likely to decline, because any time a process requires human intervention and manual steps, there is greater opportunity for failures to occur. Moreover, the opportunity for failures increases disproportionately when rapid increases in volumes occur. For decades, all industries, including the telecommunications industry, have affirmatively sought out and implemented technological improvements that reduce or eliminate manual activity in their transaction processes. Attempting to serve the mass market using the manual hot cut process on each and every customer's analog loop runs counter to that trend and can only turn back the clock on the technological advancements that have been made.

Q. HAS AT&T ASKED BELLSOUTH TO MAKE CHANGES TO IMPROVE ITS HOT CUT PROCESS?

A. Yes. AT&T has twice requested BellSouth to develop a bulk conversion processes with BellSouth. These requests were made because AT&T had found the individual hot cut process to be inadequate. Therefore, these requests were intended to provide AT&T a more efficient and effective means to migrate customers to its facilities, when it was otherwise feasible to do so.[6] In particular, it was intended to provide AT&T an additional *optional* tool for use at its discretion when the determination was made that a limited migration from UNE-P to UNE-L in unique circumstances for certain sets of customers was economically feasible.[7] AT&T did not contemplate, nor is it feasible that the processes it requested, even if implemented properly, would be capable of being used as a replacement for UNE-P.

Q. WERE THE CHANGES AS REQUESTED BY AT&T TIMELY IMPLEMENTED?

A. No. AT&T made its first request, via the BellSouth change control process, in November 2000. In March 2003 -- nearly 28 months later, BellSouth implemented a bulk ordering (not provisioning), process as a result of AT&T's change request.[8] However, that process did not meet AT&T's needs as described in the change request. In fact, the provisioning (or actual hot cut portion) of BellSouth's "new" process appears to be "business as usual," with the critical exception that it does not allow time-specific cuts, which are essential to customer satisfaction**.** The process implemented was simply the bulk ordering process mentioned earlier.

---

[6] It was also anticipated by AT&T that these new BellSouth "bulk" methods would cost less than a "one at a time" process. (See Exhibit MDV-5 August 30, 2002 letter from Denise Berger of AT&T to Jim Schenk of BellSouth)

[7] Such conditions include a high concentration of customers, facilities are "on network" using CLEC owned fiber, and spare DLC equipment is in place and effectively represents a sunk cost to AT&T.

[8] See Exhibit MDV-6, which attaches BellSouth's UNE-P to UNE-L Bulk Migration CLEC Information Package.

Q. WHAT SPECIFIC CONCERNS DID AT&T HAVE WITH BELLSOUTH'S OFFERING?

A. The process had numerous flaws that made it at least as inefficient and expensive as the old process, if not more so. Among other things, (1) the process did not allow for after-business-hours hot cuts, (2) did not provide any assurances that all end users' lines or services would in fact be provisioned at the same time or even on the same day, (3) failed to guarantee any number of total lines that BellSouth would provision in a single day, and (4) lacked a process for timely restoration of customer service in the event of a problem. Moreover, there were no cost-savings from the process.

.

Q. PLEASE DESCRIBE YOUR SECOND REQUEST OF BELLSOUTH.

A. In August 2002, AT&T requested, on a business-to-business basis, that BellSouth adopt a new process to address the insufficiency in the individual loop hot cut process. AT&T requested that the process include among other things:

- The ability to convert between 100 – 250 lines within a single Local Serving Office (LSO) in a single batch;
- That BellSouth complete its conversion readiness, including dial-tone/Automatic Number Identification ("ANI") testing, loop qualification testing and pre-wiring, in advance of the conversion;
- That BellSouth commit to immediate service restoration if a service outage occurred during the conversion process;
- The development of appropriate measurements and tracking to ensure the quality of the process, and if necessary, to further improve the process; and
- Substantially reduced prices for hot cuts.

Q. WHAT WAS BELLSOUTH'S RESPONSE TO THIS REQUEST?

A. BellSouth refused to commit to any volume of lines that could be included in a batch. BellSouth responded that AT&T's request was technically feasible except "the quantity of physical facilities and telephone numbers cut per evening will vary based on the load at the time the request is submitted, and will be driven by the actual lines per customer." It also indicated it would charge AT&T $134.32 per working telephone number, *in addition* to regular ordering and provisioning charges, as well as other unspecified overtime charges for technicians and service representatives.[9] In other words, the costs for the requested process were much higher and completely unpredictable. AT&T, of course, was unable to accept such a cost prohibitive proposal since the purpose of the request was to move customers' analog loops from UNE-P to AT&T facilities when it was economic to do so.

Q. IF BELLSOUTH WERE TO IMPLEMENT NOW THE PROCESS AT&T REQUESTED, WOULD SUCH IMPLEMENTATION SATISFY AT&T'S CONCERNS ABOUT OPERATIONAL IMPAIRMENT RESULTING FROM BELLSOUTH'S HOT CUT PROCESS?

A. No. AT&T requested this bulk hot cut process for use in limited circumstances and for relatively small volumes of customer lines. That process would not be economically or operationally adequate for the increased number of loop migrations that would be necessary in a world in which unbundled local switching is not available to CLECs. Project-managed, after hours, bulk transfers of customers on a central office and CLEC specific basis could improve the quality and efficiency of the hot cut process, and allow AT&T and other CLECs to make use of their facilities in the limited cases where such migrations are otherwise feasible. It was never contemplated that such a process, if implemented, would be adequate to support the migration volumes of customer's analog loops sufficient to serve the entire mass market. Even the best manual processes that could be operationalized today, including any batch migration process, cannot sustain competitively unconstrained migrations of hundreds of thousands of mass market customers among all carriers.

III. THE FCC'S FINDINGS OF IMPAIRMENT CAUSED BY HOT CUTS.

Q. WHAT DEFICIENCIES DID THE FCC FIND WITH THE CURRENT HOT CUT PROCESS?

A. The FCC made numerous findings regarding the inadequacy of the ILECs' current hot cut process. These findings confirm the concerns AT&T has raised about hot cuts in the past and demonstrate why AT&T moved away from provisioning mass market customers' analog loops using hot cuts to provide service to its customers.

First, the FCC recognized that deficiencies in the hot cut process are seen and felt by the CLECs' customers. It found that the problems and delays associated with hot cuts "prevent[ ] the competitive LEC from providing service in a way that mass market customers have come to expect." TRO ¶ 466. This is a substantial problem because "competition is meant to benefit consumers, and not create obstacles for them." *Id*. ¶ 467.

Second, the FCC recognized that CLECs are likely to lose customers as a result of these deficiencies. "Service disruptions also will influence customer perceptions of competitive LECs' ability to provide quality service, and thus affect competitive LECs' ability to attract customers." *Id*. ¶ 466. Specifically, the FCC found that the "record shows that customers experiencing service disruptions generally blame their provider, even if the problem is caused by the incumbent." *Id*. ¶ 467 (citations omitted).

Third, the FCC recognized that many of the deficiencies with provisioning analog loops using hot cuts are inherent in the process. The FCC concluded, based on the evidence presented, that "hot cut capacity is limited by several factors, such as the labor intensiveness of the process, including substantial incumbent LEC and competitive resources devoted to coordination of the process, the need for highly trained workers to perform the hot cuts, and

---

[9] See Exhibit MDV-7 for June 9, 2003 letter from Denise Berger of AT&T to Phillip Cook of BellSouth.

the practical limitations on how many hot cuts the incumbent LECs can perform without interference or disruption." *Id*. ¶ 465 (citations omitted).

Fourth, the FCC focused specifically on the unavoidable limitations on the volume of hot cuts the ILECs could perform. The FCC found that CLECs were impaired because hot cuts could not be performed in the volumes that would occur in the mass market: "[h]aving reviewed the record evidence, we find that it is unlikely that incumbent LECs will be able to provision hot cuts in sufficient volumes absent unbundled local circuit switching in all markets." *Id*. ¶ 468. The FCC specifically rejected ILEC arguments that the FCC's prior findings in section 271 proceedings regarding hot cuts demonstrated lack of operational impairment. The FCC correctly found that the number of hot cuts in the current market environment "is not comparable to the number that incumbent LECs would need to perform if unbundled switching were not available for all customer locations served with voice-grade loops." *Id*. ¶ 469 (citations omitted). Thus, the issue here is that there is "an *inherent limitation* in the number of manual cut overs that can be performed, which poses a barrier to entry that is likely to make entry into a market uneconomic." *Id*. (emphasis added) (citations omitted).

Finally, the FCC concluded that ILEC *promises* regarding their ability to perform any requested volume of hot cuts cannot be relied upon to demonstrate adequate performance. Specifically, the FCC found that "incumbent LECs' promises of future hot cut performance [are] insufficient to support a Commission finding that the hot cut process does not impair" CLECs. *Id*. at n. 1437.

In sum, the FCC found "ample testimony in the record" on CLECs' operational and economic difficulties with hot cuts. *Id*. ¶ 466. It recognized that "hot cuts frequently lead to provisioning delays and service outages and are often priced at rates that prohibit facilities-based competition for the mass market." *Id.* ¶ 465.

Q. PLEASE SUMMARIZE THE FCC'S ANALYSIS OF THE CONCERNS WITH HOT CUTS.

A. Consistent with AT&T's own experience, the FCC drew the following conclusions with regard to the operational deficiencies involved in the hot cut process, especially as they would apply in a market in which competitors do not have access to UNE-P:

- Hot cuts are labor intensive
- Hot cuts require the expenditure of substantial ILEC and CLEC resources
- There is a practical limitation on how many manual hot cuts an ILEC can perform
- Hot cuts often result in provisioning delays
- Hot cuts can cause significant service outages
- Poor hot cut performance causes customer dissatisfaction with individual competitors and the competitive process in general
- Hot cuts generally impose prohibitively high costs on competitors, both internal and external
- ILEC claims that current hot cut performance can be readily expanded to a "UNE-L only" environment cannot be accepted without proof of performance.

Based in part on these conclusions relating to hot cuts, the FCC made a "national finding that competitive carriers providing service to mass market customers are impaired without unbundled access to local circuit switching." *Id.* ¶ 422.

Q. WHAT OPERATIONAL CONSTRAINTS ON COMPETITION SHOULD THIS AUTHORITY REVIEW?

A. First, this Authority should review the capacity constraints of any hot cut process. Capacity limitations are imposed by the physical structure of the network and the manual nature of the process. Second, the Authority should conduct a review to ensure that all types of service configurations are adequately accommodated in any loop provisioning process. For example, the following significant market components: customers served by Integrated Digital Loop Carrier ("IDLC") loops, customers in a line splitting arrangement, and customers migrating between CLECs must not suffer higher costs or degraded service if switching is eliminated as a UNE. Third, this Authority should review BellSouth policies that impede CLECs from obtaining unbundled local switching from third parties. Fourth, migrating all mass market customers served by CLECs to UNE-L is likely to create new operational constraints. For example, new traffic patterns from the ILEC's switch-to-switch network to the ILEC's tandem network may increase the blocking of interconnection trunks behind the ILEC's tandem switches and create congestion in the ILEC's tandem switches. In developing a new batch hot cut process, this Authority must investigate and understand those concerns to assure that customers served by CLECs receive quality service.

A. <u>The Manual Hot Cut Process Has Capacity Constraints</u>

Q. WHY IS THE CAPACITY OF THE ILEC'S HOT CUT PROCESS IMPORTANT TO THIS PROCEEDING?

A. An ILEC's ability to provision mass market customers' analog loops easily and quickly between carriers at the volume or "scale" required for competition in the mass market is central to the issue of operational impairment. Clearly, if an ILEC's hot cut process creates a bottleneck or otherwise constrains the number of analog loops that can be provisioned, CLECs are operationally impaired in serving mass market customers. There is no question that current hot cut processes are predominantly manual. As such, they impose limits on the number of customer's analog loops that can be provisioned in any given day and the number of customers a CLEC can actually migrate to its services.

This manual process stands in glaring contrast to an ILEC's ability to transfer new mass market long distance customers to its services at very low cost, in very high volumes, and in a short period of time using the highly automated PIC change process that the industry has developed over the past 20 years. There are no practical limits on an ILEC's ability to provision new long distance customers through the time-tested electronic PIC migration process. If an ILEC cannot develop a hot cut process that meets the needs of the competitive mass market for local services commensurate with the scale achieved in the long distance market, then CLECs are operationally impaired, as they are relegated to manual processes which limit their ability to acquire local customers, while the ILEC enjoys virtually unconstrained ability to provision both its local and long distance service electronically.

The TRO recognizes that, in making operational and impairment decisions, state commissions must look to all factors affecting likely revenues and costs. *See* TRO at n. 1497. An ILEC will have limited costs and complete lack of operational constraints when it utilizes the PIC process for acquiring long distance customers for its bundled local and long distance service offering. That same kind of efficient, seamless, high-volume, low cost process for CLECs attempting to acquire local customers for the CLEC's bundled local and long distance service offering is necessary to ensure a level competitive playing field. If local competition for mass market customers is to be maintained and encouraged, the process for switching local carriers must be as seamless and unobtrusive to the end-user as the PIC change process.

Q. DID THE FCC ADDRESS THIS CAPACITY ISSUE?

A. Yes. The FCC's Triennial Review Order expressed a number of significant concerns regarding the capacity limitations of the hot cut process. First, the FCC found that hot cut capacity "is limited by several factors, such as the labor intensiveness of the process, including substantial incumbent LEC and competitive resources devoted to coordination of the process . . . and the ***practical limitations on how many hot cuts the incumbent LECs can perform without interference or disruption***." *Id.* ¶ 465 (emphasis added) (citations omitted). Second, the FCC stated that "[i]n deciding whether competitors are impaired by incumbent LEC provisioning processes, we must necessarily make a predictive judgment concerning this systemic capability to handle anticipated future hot cut volumes, which (absent access to unbundled local circuit switching) would be greater than volumes that have been experienced in the past . . . . Having reviewed the record evidence, ***we find that it is unlikely that incumbent LECs will be able to provision hot cuts in sufficient volumes absent unbundled local circuit switching in all markets***." ¶ 468 (emphasis added). Third, the FCC found that "the issue is not how well the process works currently with limited hot cut volumes, rather the issue identified by the record is ***an inherent limitation in the number of manual cut overs that can be performed***, which poses a barrier to entry that is likely to make entry into a market uneconomic." *Id.* ¶ 469 (emphasis added) (citations omitted).

Q. DOES BELLSOUTH'S CURRENT HOT CUT PROCESS HAVE SUFFICIENT CAPACITY TO SUPPORT MASS MARKET VOLUMES?

A. No. While BellSouth has produced no explicit information demonstrating its capacity to perform hot cuts, stating only that they are "scalable depending on volumes" (*See* BellSouth's response to AT&T Interrogatory No. 8, attached as Exhibit MDV-8), other information provided by BellSouth can be used to draw a reasonable conclusion on this issue. First, this information indicates, as I would expect, that there is a physical limit to the number of hot cuts that can be performed per technician per day. For example, in its state 271 proceedings and the FCC Triennial Review proceedings, BellSouth provided a pictorial depiction of the central office activities required to implement a hot cut including, pre- and post-cut testing, wiring, coordination, and cut-over of the circuit (*See* Exhibit MDV-9). This straight-forward example uses a single sided distribution frame, with the work at a floor level. Much more complex frame configurations are more likely to be encountered, including configurations involving intermediate as well as main distribution frames, frames located on different floors, frames with more tiers, frames that require multiple cross connections, as well as differing technologies such as solder, punch down, and /or wire wrap terminals.

As is clear from BellSouth's own representation, the hot cut process involves numerous steps, is highly manual and takes place in an environment that lends itself to (1) disconnecting the wrong loop, (2) cross connecting the loop to the wrong CFA, (3) inadvertently breaking cross-connection wires on the frame for end-users not involved in the hot cut while running in the new or disconnecting the old jumper pairs, and (4) making poor connections on the terminal block. All these errors will lead to a customer service outage which can be lengthy should the problem go undetected by the person who made the error.

Further, BellSouth's response to AT&T Interrogatory No. 11 attached as Exhibit MDV-10, indicates that it takes central office personnel working directly on the central office frame(s) between 26 and 36 minutes for the initial loop on an order to be cut over and from 17 to 19 minutes for each additional loop.[10] That equates to a maximum of 14 line conversions per shift for a technician working seven hours at an average of 30 minutes per

[10] I have included BellSouth's initial and supplemental response to Interrogatory 11 in Exhibit MDV-10, and have used the supplemental response in my analysis. However, it is noteworthy that BellSouth inexplicably and significantly reduced its central office work times to perform hot cuts in its supplemental response.

loop conversion. This forecast is consistent with Bell South's response to AT&T Interrogatory No. 44, attached as Exhibit MDV-11, an analysis it conducted for an FCC Ex Parte, in which it was assuming that in 2 to 3 shifts of technicians working per day to perform hot cuts, each technician would complete 12 to 13 conversions per shift.

Moreover, there is a limit to how many technicians can work simultaneously at a distribution frame. Again, BellSouth's own data amply demonstrate this point. For example, central office "HLWDFLWH" had 14,506 lines and BellSouth estimated that it would take 6.98 months to convert the lines in that one central office.[11] BellSouth further stated in its response to Interrogatory 44 that in making this estimate, it assumed (because this was a large office) 6 frame technicians dedicated to this task during the day and 12 at night, for an average of 9. It also stated that it assumed each technician would conduct approximately 11.5 cuts per day for approximately 104 conversions per day. Therefore, even in this "large office" with well over 100,000 lines, BellSouth would only convert 104 lines per day, even with working two shifts of up to twelve technicians. Maximum migrations of volumes such as these, which comprise a tiny fraction of the available customers, are a completely inadequate number to support meaningful UNE-based competition.

Finally, it is important to keep in mind that the BellSouth personnel responsible for the hot cut frame work are not dedicated exclusively to this task. Consideration must be made of the personnel and space availability requirements for *other simultaneous* central office activities such as new service installations for both BellSouth and CLECs, migrations back to BellSouth, troubleshooting and repairing frame related troubles on existing lines. For example, when BellSouth technicians install new wires on the Main Distribution Frame

[11] See Exhibit MDV-12 for excerpts from December 24, 2002 Ex Parte of BellSouth filed in FCC WC Docket 01-338.

"MDF" for an existing customer migration, the technicians will also have to perform a separate job (or jobs) to disconnect and remove (or "mine") the existing wires from the MDF.

Q. WHAT CAPACITY TO MANUALLY PROVISION LOOPS FOR THE MASS MARKET SHOULD BE REQUIRED?

A. The appropriate model for an analysis of required capacity is the activity in the long distance market, which is actively competitive, and therefore representative of the level of competition sought by regulators and the CLEC industry. There, the average "churn rate" – the percentage of all customers making a carrier change – is approximately 25% of all lines in a year.[12] In BellSouth Tennessee territory, that level of churn would mean if customers were moved from one carrier to another using UNE-loops exclusively, the churn would be approximately 48,813 lines per month. [Based on BellSouth's October MSS Customer Trouble Report Rate report that states it has approximately 2,343,061 POTS lines in service in Tennessee (2,068,689 retail POTS, 20,030 resale, 219,002 UNE-P, and 35,340 analog UNE-L)]. This equates to 2,218 hot cuts per business day. In such a market, BellSouth would have to perform more hot cuts in a day--every business day--than it currently performs in months. For example, in the last three months combined BellSouth has performed coordinated hot cuts for only 503 loops (See November 2003 PMAP report for Coordinated Customer Conversions measure-12 month view)

The ***minimum*** standard against which BellSouth's capacity should be assessed is the amount of hot cuts BellSouth would need to perform in a market in which competition currently relies on both UNE-P availability and UNE-L availability but, if unbundled local

[12]From the Yankee Group's 2003 TAF (Technologically Advanced Family) survey- a national household survey mailed to several thousand US households during the second quarter of the year. The study sample is selected from a Consumer Mail Panel of 600,000 representative households, which is updated annually.

switching is not available, would rely on only UNE-L availability. In other words, the Authority should compare loop volumes to UNE-P volumes to see if BellSouth is indeed capable of performing the former type of customer transfer at the same level as the latter. Elimination of UNE-P should never be allowed to materially restrict competitive choices that consumers have today. According to BellSouth's response to AT&T interrogatory 32 (See Exhibit MDV-1), it has issued an average of 12,722 service orders per month to migrate customers to UNE-P in Tennessee during a recent 14-month period.[13] During that same period, BellSouth issued an average of 34 migrations to UNE-L orders per month. (See Exhibit MDV-2). Thus, BellSouth has processed on average ***374 times more*** UNE-P migration orders each month than it has UNE-L migration orders.[14] In short, converting from using UNE-L for specialty market situations into UNE-L for the mass market requires scaling by a factor of 374 to 1.[15]

Q ARE THERE OTHER PHYSICAL STRUCTURE ISSUES THAT LIMIT THE CAPACITY OF BELLSOUTH'S HOT CUT PROCESS IN TENNESSEE?

A. Yes. The rate at which BellSouth can conduct hot cuts is also adversely affected by the extra dispatches of technicians required by: (1) unmanned central offices, and (2) hot cuts involving IDLC loops, which will require a field dispatch.[16] For example, 48% of BellSouth's central offices are unmanned. (*See* BellSouth response to AT&T Interrogatory No. 1 attached as Exhibit MDV-13).

---

[13] While the number of orders issued is not exactly equal to number of orders completed, it is a reasonable surrogate for purpose of this analysis.
[14] These numbers do not include migrations back to the ILEC, which also require provisioning work. In assessing BellSouth's capacity to do the work required, those volumes must be added.
[15] Both these models are conservative in that they do not include the additional work that would be created if any markets are found not be to impaired and thus the embedded base of UNE-P must be migrated.
[16] Field dispatches are not required in these two scenarios when migrating a customer to UNE-P.

Further, 22.0% of BellSouth's lines in Tennessee are served using Integrated Digital Loop Carrier ("IDLC").[17] As described below, loops on IDLC do not have an appearance on BellSouth's MDF and thus cannot be transferred (if at all), without additional work. At a minimum, a technician would have to be dispatched to transition the service to Universal Digital Loop Carrier ("UDLC") or copper facilities, if they are available**.**[18] As described earlier in my testimony, only 2.3% of UNE-P orders required field dispatch. Based on the IDLC percentage provided by BellSouth of 22%, BellSouth would have to dispatch technicians over 48,000 times just to convert the existing embedded base of UNE-P.[19] Dispatches such as these add complexity to the cut and could well lengthen the cut interval.

BellSouth recognizes these issues. In its response to AT&T's POD 14 in Florida (See Exhibit MDV-15), BellSouth stated "[a]dditional time to provide loops where existing service is provided over IDLC is necessary due to the fact that the process for handling a hot cut conversion is *significantly different* than with non-IDLC." Certainly the travel time and extra personnel required add to the cost and reduce the efficiency of the overall process. None of these problems affect customers served by UNE-P.

Q. DOES BELLSOUTH HAVE THE SPARE COPPER LOOP FACILITIES OR UDLC SYSTEMS TO MOVE THIS QUANTITY OF LINES OFF OF IDLC SYSTEMS?

A. BellSouth's data, provided in its response to AT&T Interrogatory No. 23 (attached as Exhibit MDV-16), indicated that of the approximately 263,000 loops on IDLC in Tennessee, approximately 104,000, or 40%, have existing parallel copper or UDLC facilities available

[17] See Exhibit MDV-14-May 5, 2003 letter from Laurel MacKenzie of BellSouth to Denise Berger of AT&T.

[18] *Id.*

for hot cut conversions. Accordingly, for approximately 60% of the loops on IDLC, spare copper facilities are not available.

Q. CAN YOU GIVE SOME SPECIFIC EXAMPLES OF THIS PROBLEM?

A. Yes. In the chart below are five examples of central offices where, of all the lines on IDLC, less than one third of those lines on IDLC have spare capacity facilities available for hot cut conversions.

CLLI Code	Address	IDLC Loops	Total Spares	%
fklntnma	Franklin	11,409	1,472	12.9
knvltnbe	Knoxville	7229	2321	32.1
mmphtnba	Bartlett	11395	2210	19.4
mrbotnma	Murfreesboro	10313	2695	26.1
nsvltnch	Nashville	4660	1076	23.1

Q. DOES BELLSOUTH HAVE AN OBLIGATION TO PROVIDE AN UNBUNDLED LOOP WHEN AT&T REQUESTS A LOOP SERVICED BY AN IDLC SYSTEM?

A. Yes. First, BellSouth has an obligation as described in the Tennessee AT&T/BellSouth Interconnection Agreement to unbundle IDLC delivered loops, using one of several alternative methods, where available. (See Attachment 2, Section 3.11 of the Interconnection Agreement). Further, the TRO requires BellSouth to deliver a loop to the CLEC even if the customer is currently served by IDLC. TRO ¶ 297 (citations omitted).

Q. IN LIGHT OF BELLSOUTH'S OBLIGATIONS, DOES AT&T HAVE CONCERNS REGARDING ITS ABILITY TO OBTAIN UNBUNDLED LOOPS FROM BELLSOUTH?

A. Yes. If switching is eliminated as a UNE, the demand for unbundled loops may well be unlike anything BellSouth has experienced to date, and the CLECs have no assurance that

[19] According to BellSouth's October 2003 MSS Customer Trouble Report Rate report, BellSouth had 219,002 UNE-P lines in service. 22 per cent of 219,002 is 48,180.

BellSouth will not experience capacity issues due to IDLC loops, especially in those central offices with high percentages of IDLC loops. AT&T is concerned that because of this prevalence of IDLC lines in many of BellSouth's central offices, CLECs may find themselves having to caveat all of their service offer marketing materials with language such as, "if available in your area." CLECs will also have to overcome negative word of mouth publicity because of their inability, through no fault of their own, to provide service to a customer.

Q. ARE THERE OTHER CONSTRAINTS ON THE CAPACITY TO PERFORM HOT CUTS CAUSED BY THE MANUAL NATURE OF THIS PROCESS?

A. Yes. Electronic order flow-through is an important component of capacity, as each instance of manual (human) intervention decreases efficiency and lengthens the provisioning interval. For example, when a service request flows through the ordering OSS without manual intervention, BellSouth is required to return a rejection in one hour or a FOC in 3 hours. However, if it falls out for manual handling, that interval becomes 10 (business) hours, which in many cases means that BellSouth can delay the order for a full day if it does not flow through. (BellSouth provides no performance data on the frequency and duration of fall-out from its provisioning systems.) Further, the percent of orders migrating service to UNE-L which were manually handled by BellSouth in Tennessee were significant: June 2003 – 91.4%, July 2003 – 74.2%, and August 2003 – 71.0%. In contrast, the UNE-P migration orders requiring manual handling for June, July and August, 2003 were as follows: 11.2%, 11.0%, and 11.3% (See Exhibits MDV-1 and MDV-2). With three fourths of the UNE-L migration orders requiring manual intervention, it is obvious that productivity will be impacted if the volumes of orders were increased many-fold.

B. Certain Market Segments Pose Special Challenges

Q. WHAT SEGMENTS OF THE MASS MARKET POSE UNIQUE CHALLENGES FOR ANY MANUAL PROVISIONING PROCESS?

A. Customers served by IDLC loops, customers in a line splitting arrangement, and customers migrating between CLECs can pose a problem for the hot cut process, especially with mass market volumes.

1. IDLC

Q. WHY DO CUSTOMERS SERVED BY IDLC LOOPS POSE SPECIAL CHALLENGES FOR A HOT CUT PROVISIONING PROCESS?

A. The architecture of the loop/switch combination on IDLC loops is substantially different from other mass market loop architectures. Instead of aggregating copper loops in cables and carrying them all the way to the MDF at the central office, the ILEC brings the loop first to IDLC equipment that is housed in a remote terminal in a neighborhood. The IDLC at the remote terminal converts the analog signals coming from the customer's telephone service to digital signals and multiplexes all the digital signals for all of the customers served by the IDLC onto a digital carrier system for transmission to the central office. At the central office, the digital loops bypass the MDF altogether and access the switch directly through a digital cross-connection frame. No analog signal or physical reappearance on an MDF is ever re-established to identify an individual subscriber's loop. Therefore, when a customer is served by an IDLC loop, there is no separable wire at the MDF that is associated with his/her individual loop that can be disconnected and reconnected to a CLEC's collocated equipment. Therefore, if a CLEC wishes to use its own switch to serve a customer that is currently on an IDLC system, BellSouth must first physically move the customer's line to a pre-existing copper facility or to a UDLC system. Loops that arrive in the central office on a UDLC system have an appearance on the MDF and therefore can be cross-connected to a CLEC's collocated equipment. As a result, loop migrations involving IDLC involve a field dispatch. Thus, the impact of this extra work must be evaluated in any consideration of eliminating switching as a UNE, which forces customers who are served via IDLC to be subject to the additional risk and complexity of an IDLC migration.[20]

2. <u>Line Splitting</u>

Q. WHY WOULD CUSTOMERS IN A LINE SPLITTING ARRANGEMENT POSE SPECIAL CONCERNS IN ANY INSTANCE WHERE SWITCHING IS ELIMINATED AS A UNE?

A. Line splitting is an arrangement that allows a DLEC (Data Local Exchange Carrier) and a CLEC to provide data and voice service over a single loop. The voice and data carriers may be the same or two different carriers. Line Splitting consists of:

(i) a UNE loop, a UNE switch port, and cross connections at a BellSouth central office,

(ii) a BellSouth owned or D/CLEC owned splitter, and

(iii) a D/CLEC owned DSLAM.

With line splitting, the voice service typically uses BellSouth facilities purchased by the CLEC as an unbundled loop and port. Since this service configuration uses both the ILEC loop and the ILEC voice switching, it is referred to here as "UNE-P based" line splitting. Exhibit MDV-17 depicts BellSouth line splitting arrangements with a D/CLEC providing the splitter, and with BellSouth providing the splitter. In both cases, the voice output of the splitter appears on the BellSouth MDF and is cross-connected to the BellSouth switch port. While there is no technical reason that the output of the BellSouth splitter could not be hot

[20] As stated earlier in my testimony, BellSouth serves 22 percent of its customers using IDLC technology in Tennessee.

cut to the voice CLEC directly from the MDF, as a matter of policy, BellSouth refuses to do it.

Q. HOW WOULD A CLEC PROVIDE DSL SERVICE TO ITS CUSTOMERS IF UNE-P, AND THUS UNE-P BASED LINE SPLITTING, WERE NO LONGER AVAILABLE?

A. In order to be able to provide voice and data services over a single loop, as is available via UNE-P based line splitting today**,** CLECs instead would have to provide DSL service via a UNE-L based line splitting arrangement, which is sometimes referred to as "loop splitting."

Q. PLEASE DESCRIBE YOUR UNDERSTANDING OF HOW UNE-L BASED LINE SPLITTING WOULD BE IMPLEMENTED IN BELLSOUTH TERRITORY.

A. UNE-L line splitting is the process by which a CLEC and a DLEC may collaborate to provide both voice and DSL service over a single copper loop without the use of ILEC provided switching. The CLEC would use a BellSouth provided loop and a non-BellSouth switch to provide voice service, and either self-provide or partner with a DLEC which would provide the data service using the high frequency portion of the loop and its own data switching network.

The only practical process available in BellSouth territory by which CLECs and DLECs can implement UNE-L line splitting today is through the use of pre-wired (dedicated) cage-to-cage cabling between their respective collocations to enable interconnection of the necessary equipment (splitter, DSLAM, and DLC). [21] A CLEC such as AT&T can only interconnect between its collocation and those of another collocated CLEC if the interconnection agreements between BellSouth and AT&T and BellSouth and the other CLEC both contain co-carrier cross connect language. See Exhibit MDV-18 for a depiction of a UNE-L Line Splitting arrangement using a single DLEC partner.

Q. WHAT OPERATIONAL CONCERNS ARE ASSOCIATED WITH USING THIS UNE-L LINE SPLITTING OR LOOP SPLITTING ARRANGEMENT COMPARED TO "UNE-P" LINE SPLITTING?

A. It is far more difficult for a CLEC to offer a DSL/voice bundle under a UNE-L arrangement than under "UNE-P". For example, UNE-L line splitting adds operational complexity and risk, costs, and potential customer impact associated with cage-to-cage cross-connects and routing the CLEC's voice path through a DLEC's collocation space.

Q. PLEASE DESCRIBE THE OPERATIONAL COMPLEXITY AND THE ASSOCIATED RISK TO CUSTOMERS IN MORE DETAIL.

A. Assume that a CLEC and a DLEC have partnered to provide voice and DSL service using a UNE-P based serving arrangement (i.e. an ILEC provided loop and ILEC circuit switching) and that the DLEC provides the splitter being used. In this scenario, as with an ordinary hot cut, the customer's loop is delivered to the DLEC's collocation over a cable pair that passes through the BellSouth distribution frame. The cable pair to be used is identified at the BellSouth distribution frame by the Connecting Facility Assignment ("CFA").[22] Once at the DLEC's collocation, the high frequency signal present on the cable pair, (the DSL signal), is separated from the voice signal by the DLEC's splitter and is routed to its

---

[21] CLECs could theoretically install non-dedicated cage-to-cage cabling between their collocations, but this would require a dispatch to each party's collocation cage to implement each new voice/DSL customer's service. The recurring dispatch costs make such an arrangement both operationally and economically infeasible.

[22] BellSouth provides CLECs with the circuit facility assignments (that is, cable and pair assignments for the cable between the CLEC's collocation arrangement and BellSouth's equipment such as distributing frames or cross-connect bays). CFAs are assigned to the CLEC at the time the CLEC's collocation arrangement is made available. Each CLEC is required to maintain its own circuit facility assignment records and assign each pair that the CLEC wants BellSouth to use in order to connect BellSouth facilities to the CLEC's facilities.

DSLAM, and ultimately connected out to its data network. The voice portion of the loop must be returned from the splitter in the DLEC collocation to the BellSouth frame (and ultimately the BellSouth switch) using a second CFA.

If instead that same CLEC and DLEC were to provide the same voice and DSL service to the same customer using a UNE-L arrangement, dedicated cage-to-cage cabling would be required, as would additional CFA management. In such a case, the customer's loop would still be delivered to the DLEC collocation from the BellSouth distribution frame on a cable pair identified by a CFA. However, the voice portion of the loop however would *not* be returned to BellSouth. Rather, it would be sent to a DLC in the CLEC's collocation area using dedicated cage-to-cage cabling, which would necessitate DLEC-to-CLEC CFAs.

The CLECs' Digital Loop Carrier (DLC) port in its collocation space that is used for voice only UNE-L service could not be used if the customer adds UNE-L based line split DSL, because the DLC port used to provide voice only service is pre-wired to the BellSouth distribution frame using dedicated cabling. Moreover, connections between the DLEC collocation and the CLEC collocation also use dedicated cage-to-cage cabling. The only alternative would be to dispatch a technician to recreate each connection. Thus the number of CFAs and the number of parties managing those CFAs increases when UNE-L line splitting is required. And, as a CLEC desires to have a business arrangement with more than one DLEC the problem becomes even larger. Exhibit MDV-19 illustrates the complexity of loop splitting when a CLEC chooses to have business relationships with multiple data providers.

Q. WHY DOES THE INCREASED NUMBER OF CFAS AND THE INCREASED NUMBER OF PEOPLE MANAGING CFAS CAUSE PROBLEMS?

A. First, maintaining proper CFA inventories has been problematic for the industry in general. Proper management of CFAs is critical to continuity of service for customers. If an incorrect CFA is used by either the ILEC or a CLEC, an end user may lose service or a change in service may be delayed. Accordingly, it is critical that all competitors, ILECs, CLECs, and DLECs maintain accurate CFA inventories and use appropriate CFAs. This becomes especially difficult in a UNE-L line splitting arrangement. The order exchange among the three parties in a UNE-L line splitting scenario must contain the information necessary for each party to determine what it is to provide, where and when. To accomplish this, the voice CLEC and the data DLEC must both send separate LSRs to BellSouth containing the CFA assignments for the BellSouth provided loop and the DLEC provided splitter. In addition, the CLEC and DLEC must select the same dedicated facility CFA between their two cages. Any differences in the CFAs on the two orders to BellSouth will cause them to be rejected and will cause delays. Likewise, if the CLEC and DLEC select different dedicated facilities between their cages, the order cannot be processed.

The greater the number of CFAs, the greater the number of potential breakage points in the service provisioning elements. This creates additional risk to the customer's voice service and greater difficulty in resolving any troubles, because the splitter is located in the DLEC's collocation cage rather than the CLEC's cage or the ILEC's common space. As a result, there must now be three parties involved in troubleshooting problems with a customer's voice service:

(i) the CLEC that owns the DLC and voice switch;

(ii) the DLEC that owns the splitter, through which the voice service passes; and

(iii) the ILEC, which provides the loop over which the voice service runs out to the end user's premises.

Thus, having the DLEC provide the splitter in a UNE-L line splitting configuration is quite different from having the DLEC provide the splitter in a UNE-P based line splitting arrangement. In the latter configuration, only the DLEC and ILEC need to be physically involved in troubleshooting complex voice problems. In a UNE-L line splitting arrangement, the ILEC, DLEC and CLEC must all be involved, and there are many more connections that could be causing the problem.

Q. PLEASE DESCRIBE THE COST IMPACTS TO AT&T OF USING A UNE-L BASED LINE SPLITTING ARRANGEMENT INSTEAD OF A UNE-P BASED ARRANGEMENT.

A. UNE-L line splitting will require rearrangements to add dedicated cage-to-cage cables and the pre-wiring of splitter ports, DSLAM ports and DLC ports to the cage-to-cage cables in advance of actually providing any service to end users. The smallest size increment available in pre-wired bundles for dedicated cage-to-cage cabling is 25 at a time. In order to mitigate the fixed costs of installation, however, CLECs would most likely want to wire most viable locations for 100 new customer installations per phase. The installation would have to include installation of more DLCs because, as described above, the DLCs used for voice only service would generally not be available. In order to avoid any increased maintenance costs, all pre-wired arrangements would be ready for service and thus would require power exactly as if they were in service. This factor automatically creates a surplus inventory that consumes power but generates no revenue. The additional cost of committing such network resources in advance is significant. For example, assume a CLEC with an established collocation providing voice service were to add the necessary equipment to be able to partner with a DLEC collocated approximately 50 feet away from the CLEC in the ILEC central office. The CLEC would provide DSL service to its customers via UNE-L line splitting arrangements described above. The CLEC would incur the following up front costs for *each* DLEC with whom it chose to partner.

DLC Bay – One Shelf	$30,556.00
Pots Bay –Termination Block	$1,001.00
Cage to Cage Connectivity Costs–Non ILEC	2,445.00
Application Fee to BellSouth	$585.09.
Total up front costs	34,587.09.18

Additionally, BellSouth would charge $46.26 per month for electrical power for this equipment as well as recurring charges per foot of cable run between the cages. Importantly, these costs are extremely conservative, as they do not include OSS costs for such items as additional CFA management, extra construction charges such as traversing fire stops (which can add hundreds, even thousands of dollars), and maintenance.

Q. DOES THE PROCESS YOU DESCRIBED MEET THE REQUIREMENTS OF THE TRO?

A. No. The FCC stated "we have also determined that an incumbent LEC's failure to *provide* cross-connections between the facilities of two competitive LECs on a timely basis can result in impairment." TRO ¶ 514 (emphasis added). The expensive and cumbersome process described above merely permits CLECs to cross-connect to each other; BellSouth does not *provide* the cross-connections.

3. CLEC-to-CLEC Migrations

Q. YOU MENTIONED THAT ANY HOT CUT PROVISIONING PROCESS MUST ADDRESS CLEC-TO-CLEC MIGRATIONS. WHAT ARE THE CONCERNS THAT ARISE WHEN A CUSTOMER SWITCHES FROM ONE CLEC TO ANOTHER?

A. As the mass market matures, migrations between CLECs will occur more frequently. Currently, there are no standard or agreed-upon processes or intervals between CLECs for responding to requests for information such as customer service records and other customer transition information that is needed to create service orders. Similarly, there are no standard processes for order status responses, such as FOCs and rejections. Further, the in-depth procedures needed for migrating the customer are lacking or ill-defined. For example, items as basic as agreed-upon intervals for migrating a customer from one CLEC to another have not been established. In addition, the ILEC will have to be involved in all hot cuts because it performs the necessary loop transfers and manages directory listing changes. However, requests to have the ILEC transfer the loop from one CLEC to another must be submitted to the ILEC manually, adding delay, error, and expense.

Accordingly, efficient processes must be developed for both the “winning” and the “losing” CLECs so they can place orders with the ILEC and interact with each other and the ILEC to have customers efficiently migrated. Without these improvements, the current lack of efficient and equitable ordering and provisioning processes for CLEC to CLEC hot cut migrations will create more delay, customer confusion, expense, and customer outages in the industry. In contrast, a CLEC to CLEC migration using UNE-P requires only an electronic order from the CLEC acquiring the customer. The CLEC losing the customer electronically receives or obtains a line loss report.

Q. WHAT CONCERNS DO YOU HAVE REGARDING BELLSOUTH'S CURRENT CLEC TO CLEC PROCESS?

A. First, BellSouth requires that local service requests to move a UNE loop from one CLEC to another be submitted manually. Other problems include: ***Begin confidential-- [redacted] End confidential***

C. <u>Wholesale Switching, if Available, Poses Special Problems</u>

Q. ARE CLECS ABLE TO OBTAIN LOCAL SWITCHING FROM THIRD PARTIES?

A. No. BellSouth's policies, practices, and systems effectively prevent a CLEC from being able to order a loop from BellSouth and switching from another CLEC, thus precluding CLECs from purchasing alternative local switching from wholesalers. For example, if AT&T were to submit a service request to purchase a loop from BellSouth and deliver it to another CLEC's collocation, BellSouth's systems could not process the order.

Q. WHAT IS REQUIRED FOR A CLEC TO BE ABLE TO ORDER A LOOP FROM BELLSOUTH AND WHOLESALE SWITCHING FROM ANOTHER CLEC?

A. Under today's processes, a CLEC sends BellSouth a Local Service Request ('LSR") that tells BellSouth, among other things, three critical pieces of information: (1) "who I am," (2) "where I want your service delivered," and (3) "where to send my bill." An LSR contains many fields into which the CLEC will insert the necessary information or codes to convey this information. Various industry groups and standards provide guidance as to the fields and codes used on an LSR, but BellSouth determines how the information will be used by its systems and in its databases after the LSR has been received.

As part of its "who I am" information on its LSR, the CLEC must provide BellSouth with its Access Customer Name Abbreviation ("ACNA"). The ACNA identifies who is to be billed for the services (*i.e.*, the loop) ordered. As part of its "where I want your service delivered" information on its LSR, the CLEC must also provide BellSouth with an Access Customer Terminal Location ("ACTL").[23] The ACTL identifies the location where BellSouth's loop is to be delivered for connection with a CLEC's equipment. Accordingly, the ACNA tells BellSouth "who I am" and the ACTL tells BellSouth "where I want your service delivered."

Q. HOW DOES A PROBLEM ARISE?

A. BellSouth currently requires that the ACNA or "who I am" of the CLEC ordering service from BellSouth be the *same* as the ACNA associated with the ACTL or "where I want your service delivered" code. This requirement effectively precludes a CLEC from ordering a loop from BellSouth and connecting it to the collocation arrangement of a different CLEC in order to use that CLEC's switch.

[23] "Where I want your service delivered" codes are actually address information. The principal "code" used for these purposes is the Common Language Location Identifier ("CLLI"), which is either 8 or 11 characters long and is developed in accord with guidelines provided by Telcordia, which also keeps the master CLLI Database. Each CLLI has an "owner," and that owner is identified in the CLLI Database by the owner's Interexchange Access Customer code, or ACNA. This CLLI code is used to populate the Access Customer Terminal Location ("ACTL") field. Connecting Facility Assignment ("CFA"), Cable Identification ("Cable ID"), and Channel or Pair Identification ("Chan/Pair") are another group of "codes," which, while they are different items, are commonly referred to as CFA. All tell BellSouth the actual physical point where it is to deliver its services to the CLEC. Often the terms ACTL and CFA are used interchangeably to represent this physical point of interconnection.

Q. IS THERE ANY INDUSTRY REQUIREMENT THAT A CLEC ORDERING SERVICE TO BE DELIVERED TO A SPECIFIC LOCATION BE THE OWNER OF THAT LOCATION?

A. No. However, BellSouth's systems improperly include edits that require that the ACNA ("who I am") associated with the ACTL ("where I want your service delivered") on an order must match the ACNA submitted on the order. If United Parcel Service were to use the same concept or edit, they would be telling you that you can only send packages to your own address.

Q. HOW DOES AT&T KNOW THIS PROBLEM EXISTS AT BELLSOUTH?

A. AT&T has experienced this problem in the limited cases in which it has ordered UNE loops from BellSouth. AT&T, because of its acquisition of TCG, owns collocations that were built pursuant to TCG's agreement with BellSouth as well as collocations that were built under AT&T's direct agreement with BellSouth. The codes used to describe TCG collocations are labeled "TPM" and the codes for the AT&T collocations are labeled "ATX." When an order sent to BellSouth using the "TCG" label seeks to purchase an unbundled loop from BellSouth and wants it directed to an AT&T collocation that is labeled "ATX," BellSouth's systems cannot electronically process the order.

Q. HOW WILL THIS PROBLEM AFFECT THE INDUSTRY AS A WHOLE?

A. BellSouth's systems currently look for a match between the codes for "who I am" and "where I want your service delivered." When these codes do not match, these orders fall out for manual handling. BellSouth has in the past addressed this problem for AT&T with a manual work-around that assigned a secondary code to identify all the collocations as belonging to AT&T. However, BellSouth has recently indicated to AT&T that "BellSouth has no plans to continue to service orders that require manual processing" caused by the use of multiple company codes, and reiterating its previous recommendation that AT&T pay for a mechanization upgrade to "allow multiple ACNA orders to flow-through BellSouth's systems without manual intervention".[24] This work-around (at best) or outright refusal to process orders (at worst) obviously will not be sufficient in a world in which CLECs may choose to purchase unbundled local switching from each other or from wholesale providers. CLECs must be able to order a loop and have that loop delivered to someone else's collocation space.

Q. HAS BELLSOUTH BEEN ABLE TO DEMONSTRATE AT ANY TIME DURING THE AT&T/BELLSOUTH DISCUSSIONS THAT ITS POSITIONS ARE SUPPORTED BY INDUSTRY STANDARDS OR TECHNICAL INFEASIBILITY?

A. No. In fact BellSouth's correspondence clearly states that its positions are based exclusively on its self-generated policy. Exhibit MDV-21 is a June 20, 2002 letter from Mr. James M. Schenk of BellSouth to Mrs. Denise Berger of AT&T. In this letter Mr. Schenk states:

> "It is BellSouth's policy not to accept assignments from CLECs other than the owner of the collocation space and associated cable assignments. Therefore, BellSouth's ordering and provisioning systems contains edits to prevent unauthorized assignment of its customer's collocation assets." (Letter, page 1)

Q. WHAT SHOULD THE AUTHORITY DO TO SOLVE THIS BELLSOUTH CAUSED PROBLEM?

A. BellSouth unilaterally placed itself in the role of CLEC "asset policeman" implementing edits that are not required by any industry guidelines and that needlessly restrict CLECs' ability to do business in BellSouth's region. Having established these

[24] See Exhibit MDV-20-July 21, 2003 letter from Jim Schenk of BellSouth to Denise Berger of AT&T.

needless edits, BellSouth then declared all transactions that fail to pass its self-defined edits are “out of process” when in fact it is the edits themselves that are unjustified. BellSouth must have in place policies that do not impede competition. It should be required to delete these unnecessary edits. Moreover, any provisioning process must contemplate and provide for CLECs that want to use a third-party’s switch.

D. <u>Operational Constraints That Will Be Created If All Migrations Require UNE-L Conversions</u>

Q. ARE THERE NEW OPERATIONAL CONSTRAINTS THAT WILL ARISE IF ALL UNE-P CUSTOMERS ARE MIGRATED TO UNE-L?

A. If UNE-P is no longer available to CLECs, there will be significant changes in traffic patterns and the items CLECs order from BellSouth. As a result, BellSouth’s network may have insufficient capacity in certain instances and surplus capacity in others. Two specific examples are trunking and collocation space.

Q. WHAT IS TRUNKING?

A. The transport pathways that carry calls from switch to switch are called interconnection trunks. Within the local network, such trunks connect BellSouth’s central office switches, CLEC switches to BellSouth switches, and may connect BellSouth’s central office switches to tandem switches. Tandem switches often are used by ILECs to serve as a connector between central offices. Tandems are used because it is not always efficient to connect each central office to every other central office or to connect these offices for their full complement of traffic during peak times. In such cases, the ILEC will connect the central offices to a tandem switch. Traffic may flow from any central office switch to the tandem and then from the tandem to any other switch in the network.

Q. HOW WILL TRUNKING BE AFFECTED IF ALL MASS MARKET CUSTOMERS MUST BE SERVED USING UNE-L?

A. Many trunks will be over utilized while some may be under utilized. To understand these impacts, the Authority must first recognize that, with UNE-P, all traffic travels on BellSouth's transport network. If BellSouth connects Central Office 1 with Central Office 2 using direct trunking, all calls between those switches will generally travel through that trunk without every passing through a tandem switch. If, however, all CLECs must provide service using their own switches, those switches will principally be connected to BellSouth's network using BellSouth's tandem switches, because the CLEC does not have the economies of scale to connect directly to each and every BellSouth local switch. Accordingly, nearly every call from a CLEC customer, whether to a BellSouth customer or to another CLEC's customer will have to pass through trunks connected to BellSouth tandems. When a trunk is carrying its total capacity for calls, the next call is blocked which means the customer gets a "fast busy" signal and the call cannot complete. If all UNE-P customers are migrated to UNE-L, significant blocking of trunks connected to the tandem or tandem switching congestion can be expected. Accordingly, the Authority must investigate the effects that forcing traffic onto UNE-L may have on BellSouth's tandem and interconnection facilities, to assure that CLEC customers' quality of service would not be degraded if CLECs no longer have access to UNE-P.

Conversely, in some cases, interconnection trunks between BellSouth central office switches may be under utilized. Because calls to and from CLEC customers will travel through BellSouth's tandem switch, there will be less demand for the shared transport between BellSouth's central office switches. However, the extra capacity there cannot be redeployed to accommodate this shift in traffic patterns.

Q. WHAT OTHER OPERATIONAL CONSTRAINTS WILL ARISE?

A. If unbundled local switching is no longer available to competitors, all competitors will have to install their own facilities in collocation space. For example, at least 130 of BellSouth's central offices in Tennessee have UNE-P service but no collocated CLECs. (See Exhibit MDV-22). It is unclear whether BellSouth will be able to accommodate the dramatic increase in the space that will be needed as CLECs expand existing collocations or when new CLECs that were formerly UNE-P only providers seek to install equipment. At the very least, the interval to obtain and build out collocation space likely will increase. At the worst, sufficient space may not be available, especially in remote central offices that are generally very small in size.[25]

IV. AT&T'S RECOMMENDATIONS

Q. DID THE FCC IDENTIFY A STANDARD AGAINST WHICH AN ILEC'S HOT CUT PROCESS SHOULD BE MEASURED?

A. Yes. In describing a hot cut process that demonstrated "consistently reliable performance," the FCC recognized that for the migration of customers, UNE-P should be the standard of performance. It stated: "This review is necessary to ensure that customer loops can be transferred from the incumbent LEC main distribution frame to a competitive LEC collocation *as promptly and efficiently as incumbent LECs can transfer customers using*

[25] The FCC identified available collocation space as an issue. TRO ¶ 513. "We find that the absence of sufficient collocation space in the incumbent central office or offices might in some markets render competitive entry impossible and thus result in impairment. We therefore direct the state commissions to consider evidence concerning the costs and physical constraints associated with collocation in a particular market. We direct state commissions to consider whether competitive entry is inhibited, or is likely to be inhibited going forward, by the exhaustion of available collocation space in the incumbent LEC's central offices. Evidence relevant to this inquiry would include, for example, the amount of space currently available in those central offices; the expected growth or decline, if any, in the amount of space available; and the expected growth or decline, if any, of requesting carriers' collocation space needs, assuming that access to unbundled switching were curtailed. The state commissions shall consider this factor in determining whether to find that requesting carriers are not impaired without access to unbundled local circuit switching."

unbundled local circuit switching." TRO at n. 1574 (emphasis added). Thus, the appropriate comparison must be whether the ILEC can move customers served by UNE-L at the same volumes and performance levels as UNE-P. This is perfectly logical, since CLECs would be forced to abandon UNE-P and substitute UNE-L if they are denied access to unbundled local switching.

Moreover, such a standard is required in order to provide parity to all carriers that seek to provide a bundle of both local and long distance services to mass market customers. ILECs today can (and do) add large numbers of long distance customers through the electronic PIC process, which is very comparable to the electronic OSS used to provide UNE-P service. If CLECs cannot have the same ability to add local customers, they are seriously impaired in their ability to provide similar bundled offers. Indeed, the RBOCs themselves have recognized that the ability to offer such bundles is a major competitive advantage in fending off CLECs and/or winning back CLEC local customers. Further, since the FCC's impairment standard requires a review of all costs and revenues a CLEC would incur, including long distance, CLECs must have the same ability to offer local/long distance bundles as the ILEC.

Q. WHAT INFORMATION DOES THIS AUTHORITY REQUIRE FROM THE ILEC TO DETERMINE IF ITS HOT CUT PROCESS COULD SERVE THE MASS MARKET?

A. AT&T believes it is clear from available information that BellSouth's current hot cut process capability, demonstrated by its own data, is not capable of supporting mass market competition. However, in conducting any assessment of the capacity of BellSouth's hot cut process (quantity) along with adequate quality, it is essential for BellSouth to provide the following information, with appropriate and adequate supporting detail, so that the Authority can ascertain the relative capability BellSouth has to provision service to mass market customers:

1. Proof that a neutral, third-party, valid time and motion study has been conducted to determine the time it takes to perform all of the steps necessary on the frame to perform a hot cut, and that volume testing has also been conducted.
2. Determination of the ILEC's maximum daily hot cut throughput based on the output of the time and motion study and its current staffing levels.
3. The ILEC's estimate of the daily hot cut volumes it will face in a non-UNE-P environment and the supporting details on how it arrived at this estimate.
4. The ILEC's human resources strategy specifically outlining the number of additional people it will need and how it plans to recruit, hire and train these additional people.
5. Outputs from a third party-monitored ILEC testing using its own collocation and migration of significant numbers of its own customers through hot cuts from direct connection to its switch to its collocation equipment installed to operate as a pseudo-CLEC specifically for this test.
6. The ILEC's plans for converting the embedded base of UNE-P customers while continuing to perform its normal day-to-day frame work.
7. Disclosure of an inventory of its access lines on IDLC facilities and the amount of spare copper/UDLC facilities that these lines can be migrated to.
8. Disclosure of an inventory of the collocation space readily available in each central office in Tennessee and its plan for how it will support the additional requests it could be expected to receive for new collocation arrangements and augments to existing arrangements, together with the impacts that this plan will have on existing collocation intervals.
9. The ILEC's plans for how it will expand its tandem switching and associated transport network to accommodate all of the additional traffic it will be receiving from the CLEC switches.
10. The ILEC's plans for deploying new technologies to eliminate the manual efforts associated with a hot cut.

Moreover, the answers to these questions alone do not adequately describe what capacity or scalability means. In a fully competitive market, carrier changes occur in multiple directions: from ILEC to a CLEC, from a CLEC to an ILEC, from a CLEC to another CLEC. Mass-market scalability means that the ILEC can manage all of these types of transactions over its entire geographic footprint each day and every day. That is a substantial task that is being achieved in the long distance market using the PIC process and in the local market today using UNE-P. Further, as the TRO economic impairment test requires CLECs to use a model that includes both local and long distance revenues, failure to have comparable processes for use by ILECs and CLECs for both local and long distance will result in significant impairment to CLECs.

The ILECs should not be allowed to respond to this absolutely critical issue with vague assurances that its processes are scalable or otherwise capable of supporting mass market UNE-L competition.[26] Both central office specific and statewide analysis, documentation and testing is necessary, and the benchmark adopted must demonstrate BellSouth's ability to perform sufficient volumes to support a fully competitive market at the same performance level as UNE-P, in order to ensure robust mass market competition.

Q. GIVEN THAT THE IMPROVEMENTS THAT CAN BE MADE TO THE CURRENT MANUAL PROCESS ARE ALMOST CERTAINLY INADEQUATE TO OVERCOME THE ECONOMIC AND OPERATIONAL IMPAIRMENTS IDENTIFIED BY THE FCC, WHAT OTHER SOLUTIONS SHOULD THIS AUTHORITY CONSIDER?

A. As discussed above, the FCC found, on a national basis, that CLECs are impaired in their ability to provide local exchange service because, among other things, of the expense, delay and service degradation caused by the current, manual hot cut process. This should

[26] *See TRO* n. 1437 ("We find, however, incumbent LECs' promises of future hot cut performance insufficient to support a Commission finding that the hot cut process does not impair the ability of a requesting carrier to provide the service it seeks to offer without at least some sort of unbundled circuit switching. While incumbent LECs state that they have the capacity to meet any reasonable foreseeable increase in demand for stand-alone loops that might result from increased competitive LEC reliance on self-provisioned switching, there is little other evidence in the record to show that the incumbent LECs could efficiently and seamlessly perform hot cuts on a going-forward basis for competitors who submit large volumes of orders to switch residential subscribers.")

logically prompt state regulators to question whether, in an age of digital processing, any manual, labor-intensive, and error-prone system for loop migration will ever be efficient enough, both economically and technically, to support robust local exchange competition.

There is a means available that uses currently available technology and allows the provisioning of loops to be operationally and competitively neutral, making it the local service counterpart of "equal access" in the long-distance market. This is a process that AT&T has generically referred to as "electronic loop provisioning" ("ELP"). In this environment, consumers would be able to change their local carrier seamlessly, and no carrier would have inordinate advantages in competing for a mass market customer's business. This is in sharp contrast to the current, hard-wired, manual connections from customer premises to ILEC central offices described in the accompanying testimony of Jay Bradbury. Implementation of such an electronic provisioning process would create permanent virtual circuits that could use software commands to shift loops from one carrier to another quickly and inexpensively, with no loss or degradation of service. Thus, the Authority should consider whether the use of ELP -- or some other automated process -- is necessary to place all competitors on an equal footing in their ability to provide service using mass market loops and CLEC-provided switching.

V. <u>CONCLUSION</u>

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. The process of migrating customers to a CLEC-owned switch using an ILEC loop, the so-called "hot cut process," is extremely dependent on manual work, rendering the process prohibitively expensive, highly error prone, and not scalable to handle reasonable commercial volumes. As such, CLECs will remain impaired by any manual hot cut or loop migration process. Even the best manual processes that could be operationalized today, including batch migration processes, cannot satisfy the requirements needed to eliminate the CLECs' operational impairment in attempting to compete for mass-market customers. Accordingly, this Authority should find that CLECs are impaired due to the economic and operational issues associated with hot cuts. At the same time, this Authority should encourage development of a process that automates the transfer of end-user loops. Any migration process that does not automate the transfer of end-user loops, eliminating the need for manual "hot cuts," cannot sustain competitively unconstrained migrations of customers among all carriers, both CLECs and ILECs alike. In order to establish and sustain competitively unconstrained migrations of customers among all carriers, an electronic process for loop provisioning must be made available which is as easy, efficient, and reliable as the UNE-P provisioning process for local customers and the PIC change methodology in place for long distance.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

BEFORE THE TENNESSEE REGULATORY AUTHORITY

NASHVILLE, TENNESSEE

IN RE:

IMPLEMENTATION OF THE FEDERAL	**)**	
COMMUNICATIONS COMMISSION'S	**)**	**DOCKET NO.**
TRIENNIAL REVIEW ORDER – 9 MONTH	**)**	**03-00491**
PROCEEDING MASS MARKET SWITCHING	**)**	

DIRECT TESTIMONY OF DON J. WOOD

ON BEHALF OF

AT&T COMMUNICATIONS OF THE SOUTH CENTRAL STATES, LLC

JANUARY 16, 2004

I. BACKGROUND AND PURPOSE

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Don J. Wood. I am a principal in the firm of Wood &Wood, an economic and financial consulting firm. My business address is 30000 Mill Creek Avenue, Suite 395, Alpharetta, Georgia 30022. I provide economic and regulatory analysis of the telecommunications, cable, and related convergence industries with an emphasis on economic policy, competitive market development, and cost-of-service issues.

Q. PLEASE DESCRIBE YOUR BACKGROUND AND EXPERIENCE.

A. I received a BBA in Finance with distinction from Emory University and an MBA with concentrations in Finance and Microeconomics from the College of William and Mary. My telecommunications experience includes employment at both a Regional Bell Operating Company ("RBOC") and an Interexchange Carrier ("IXC").

Specifically, I was employed in the local exchange industry by BellSouth Services, Inc. in its Pricing and Economics, Service Cost Division. My responsibilities included performing cost analyses of new and existing services, preparing documentation for filings with state regulatory commissions and the Federal Communications Commission ("FCC"), developing methodology and computer models for use by other analysts, and performing special assembly cost studies.

I was employed in the interexchange industry by MCI Telecommunications Corporation, as Manager of Regulatory Analysis for the Southern Division. In this capacity I was responsible for the development and implementation of regulatory policy for operations in the southern U. S. I then served as a Manager in MCI's Economic Analysis and Regulatory Affairs Organization, where I participated in the development of regulatory policy for national issues.

Q. HAVE YOU PREVIOUSLY PRESENTED TESTIMONY BEFORE STATE REGULATORS?

A. Yes. I have testified on telecommunications issues before the regulatory commissions of thirty-five states, Puerto Rico, and the District of Columbia. I have also presented testimony regarding telecommunications issues in state, federal, and overseas courts, before alternative dispute resolution tribunals, and at the FCC. A listing of my previous testimony is attached as Exhibit DJW-1.

I have testified before the Tennessee Regulatory Authority ("TRA") on issues related to cost of service and competitive market entry on several occasions, most recently in Docket No. 03-00119.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I have been asked by AT&T Communications of the South Central States, LLC ("AT&T") to describe the framework for the type of economic impairment analysis discussed by the FCC in the Triennial Review Order ("TRO"). Specifically, I am addressing the FCC's guidelines for an analysis of "economic impairment" for local circuit switching used to provide competitive service to mass market customers.

II. USES AND LIMITATIONS OF AN ECONOMIC IMPAIRMENT ANALYSIS

Q. IS THE TRA REQUIRED TO CONDUCT AN ECONOMIC IMPAIRMENT ANALYSIS?

A. Not necessarily. In the Triennial Review Order, the FCC stated: "[w]e find on a national level that requesting carriers are impaired without access to unbundled local switching when serving mass market customers." TRO ¶ 419; *see also* ¶ ¶ 422, 424, 459, 476, 479 and 493. Impairment exists unless and until specific, concrete evidence to the contrary is identified.

ILECs seeking to set aside that finding of impairment may rely on the "triggers" set forth in the TRO. *See* TRO ¶ 501. If the ILEC cannot establish that CLECs are self-provisioning switches to serve the mass market, the ILEC may attempt other means of demonstrating that there is no impairment. In that instance, the TRA, if it wants to consider a finding of "no impairment," must conduct a granular analysis that includes an assessment of both operational and economic impairment. *See* TRO ¶ ¶ 511-520.

Q. CAN THE TRA MAKE A FINDING OF "NO IMPAIRMENT" BASED ONLY ON AN ECONOMIC ANALYSIS?

A. No. According to the FCC, a determination of whether lack of access to an unbundled network element will "impair" a CLEC's ability to enter the market requires an analysis of "whether lack of access to an incumbent LEC network element poses a barrier or barriers to entry, including operational and economic barriers, that are likely to make entry into a market uneconomic." TRO ¶ 56. The TRA must analyze operational and economic factors "in concert." Clearly, if a CLEC is impaired because of operational barriers in a given market, no economic analysis will change that fact. Conversely, a lack of operational barriers cannot offset the existence of an economic barrier. A finding of impairment must be reached if either operational *or* economic barriers are found to exist. My testimony addresses only economic impairment.

Q. IS IT LIKELY THAT AN "ECONOMIC IMPAIRMENT" ANALYSIS WILL ESTABLISH THAT ECONOMIC IMPAIRMENT DOES NOT EXIST?

A. No. Since 1996, CLECs have engaged in a wide variety of entry strategies. Many of these strategies have been based on an analysis of the same market-specific costs and potential revenues that the FCC contemplates in its analysis. The investors who funded - or elected not to fund - these entry strategies likewise considered these same factors.

Since 1996, I have worked with CLECs in most aspects of their market entry plans and have assisted investors (and potential investors) with their analyses of CLEC business plans. In my experience, the individuals who undertook these analyses for both carriers and investors were qualified to undertake the effort and to generate meaningful results. Yet the market realities (as revealed in the results of the triggers analysis) make it abundantly clear that CLECs either (1) could not economically justify the deployment of their own local switching equipment to serve mass market customers, and so decided not to make the investment, or (2) decided (in what in hindsight proved to be a bad decision) to make this investment, were unsuccessful, and are no longer attempting to use this entry vehicle as a means of serving mass market customers. This real-world experience of CLECs and investors over the last seven years reveals that CLEC deployment of their own local circuit switching equipment to serve mass market customers is not economically viable. Some previously elusive formula for making it economically viable is not likely to materialize in the midst of a contested state proceeding. It is even more unlikely that this elusive formula will finally reveal itself in the results of a BellSouth "business case" model.

Q. ARE YOU SUGGESTING THAT THERE IS NO BENEFIT TO CONDUCTING AN "ECONOMIC IMPAIRMENT" ANALYSIS?

A. No. As I will describe in more detail later in my testimony, the FCC found the "economic impairment" analyses that it reviewed are highly sensitive to the underlying inputs and assumptions. A properly developed model, therefore, could be used to gain insight into which factors make the most significant contribution to the existing impairment and how changes in these factors (in terms of changes due to market response over time or changes induced through changes in regulatory requirements) impact the overall equation. The results of such an analysis would indicate whether a specific regulatory action has the potential, on a prospective basis, to reduce impairment for some markets in some circumstances.

III. THE FCC'S ECONOMIC IMPAIRMENT GUIDANCE

Q. WHAT GUIDANCE DID THE FCC PROVIDE TO STATE COMMISSIONS FOR CONDUCTING AN ECONOMIC IMPAIRMENT ANALYSIS?

A. In section VI.D.6.a.(i)(b) of the TRO, the FCC discusses the economic factors that may be relevant to states' determinations. The FCC focused principally on the primary cost disadvantage faced by CLECs, "the cost of backhauling the voice circuit to their switch from the customer's end office." The costs of backhaul "include the costs of collocating in the customer's serving wire center, installing equipment in the wire center in order to digitize, aggregate, and transmit the voice traffic, and paying the incumbent to transport the traffic to the competitor's switch" *Id*. at ¶480.

As shown in the testimony of Mr. Turner, this cost disadvantage is significant. Indeed, in my view, it is sufficient in and of itself to create economic impairment for CLECs.

Q. DID THE FCC REVIEW INFORMATION PROVIDED BY CLECS AND ILECS REGARDING OTHER ECONOMIC FACTORS?

A. Yes. In its review, the FCC considered studies conducted by both ILECs and CLECs. CLEC studies focused on the cost disadvantage created by the need to backhaul the traffic to the CLEC switch, while ILEC studies focused on the "revenue opportunities" available. Compare TRO ¶ 481 and ¶ 482. The FCC ultimately determined that none of the studies was sufficient to "form a basis for making a national finding of no impairment, or a finding of impairment on the basis of non-hot cut factors alone." *Id*. at ¶ 485. The FCC did conclude, however, that it was "persuaded that other economic factors, in addition to the economic and operational barriers associated with the current hot cut process that we have already identified, may make entry uneconomic without access to the incumbent's switch." TRO ¶ 484. Accordingly, the FCC found that the studies before it "strongly support the need for a more granular analysis of impairment … Such an analysis would require complete information about UNE rates, retail rates, other revenue opportunities, wire center sizes, equipment costs, and other overhead and marketing costs." TRO ¶ 485.

Q. WHAT COSTS OTHER THAN THE BACKHAUL COSTS ARE RELEVANT TO AN ANALYSIS OF "ECONOMIC IMPAIRMENT"?

A. The FCC identified several additional types of costs. They included: the cost of purchasing and installing a switch; the recurring and non-recurring charges paid to the incumbent LEC for loops, collocations, transport, hot cuts, OSS, signaling, and other services and equipment necessary to access the loop; the cost of collocation and equipment necessary to serve local exchange customers in a wire center, taking into consideration an entrant's likely market share, the scale economies inherent to serving a wire center, and the line density of the wire center; the cost of backhauling the local traffic to the competitor's switch; other costs associated with transferring the customer's service over to the competitor; the impact of churn on the cost of customer acquisitions; the cost of maintenance, operations, and other administrative activities; and the competitors' capital costs. TRO ¶ 520.

The FCC also noted that an economic impairment analysis should take into account the impact of scale economies and line densities on the costs incurred by ILECs and CLECs. TRO ¶ 520. Because many of the costs of providing local telecommunications services are fixed at some level, ILECs begin their efforts to compete with a unit cost advantage that CLECs cannot overcome without capturing sufficient market share. Even if it is theoretically possible for a CLEC to reduce its costs over time by achieving a significant market share, it cannot do so immediately. This time dimension is extremely important. The CLEC must make an investment that represents a significant fixed cost before serving any customers at all, and then must hope that it will achieve a threshold market share that makes the investment economically viable.

Q. CAN A COST DISPARITY ALONE CREATE IMPAIRMENT?

A. Yes, depending on which of the categories of cost creates the cost disadvantage. A disparity in the level of the costs that both the ILEC and CLEC must incur (assuming the CLEC can achieve the same scale economies as the ILEC) may not create impairment because an efficiently operating CLEC could overcome this cost disparity

– over time – if it could achieve the necessary scale of operations. In direct contrast, any costs that a CLEC must incur that the ILEC, as the incumbent monopoly provider, avoids do create impairment. The necessity of recovering backhaul-related costs and the inability of a CLEC to achieve the same scale economies as the ILEC in a given market both fall into this category. As I will explain below, no CLEC can "grow out of" this kind of cost disadvantage, and the resulting impairment cannot be overcome, and the resulting impairment cannot be eliminated merely by a broadening of the analysis to consider revenue opportunities.

Q. WHAT REVENUES ARE RELEVANT TO AN ANALYSIS OF "ECONOMIC IMPAIRMENT"?

A. After reviewing the studies presented by both ILECs and CLECs, the FCC found that revenue assumptions have a "significant impact" on the results. TRO ¶ 485. In its analysis, the FCC noted that "[t]he revenue estimates, which depend on customers' predicted expenditures on local voice service, were particularly controversial, and appear to have had a significant impact on the results." *Id*. The potential revenues include the basic retail price charged to the customer, the sale of vertical features, universal service payments, access charges, subscriber line charges, and, if any, toll revenues" TRO ¶ 519.

The FCC's focus on "predicted" or "potential" revenues is an important consideration. A CLEC that elects to invest in its own local switching facilities to serve mass market customers must recover the cost of those facilities over time from the revenues received from these customers. Prior to making such a substantial investment, a prudent CLEC will consider not only current revenue levels but also likely changes in those levels over time.

Some revenue changes may be predicted from current market trends. For example, it would clearly not be prudent for a CLEC to base its investment decision on an expectation of higher toll revenues in the future. Other revenue changes can be predicted by considering the operation of competitive market forces. Successful entry by a CLEC, particularly a CLEC that manages to increase its market share over time, will certainly inspire a competitive pricing response by the ILEC. As the FCC correctly noted, a market that is currently characterized by high rates and low costs is most likely to support self-provisioning of a switch by a CLEC to serve mass market customers. TRO ¶ 484 and n. 1499. It is important to recognize, however – and a prudent CLEC considering an investment of the scale of a circuit switch would certainly do so – that high prices and low costs do *not* represent a relationship that is likely to be maintained in an effectively competitive market. By definition, effectively competitive markets do not have such relationships. It is essential, therefore, for a CLEC to consider the potential revenues it would receive – and how the level of those potential revenues can be expected to change over time –when deciding whether to use its own local circuit switching equipment to serve mass market customers. Such a consideration is fully consistent with the FCC's conclusion that when "judging whether entry is economic," states must consider how "competitive risks affect the likelihood of entry." TRO ¶ 517.

Q. YOU STATED PREVIOUSLY THAT THE CLECS' COST DISADVANTAGE CREATED BY THE NEED TO BACKHAUL TRAFFIC FROM THE LOOP AGGREGATION POINT TO ITS SWITCH IS SUFFICIENT TO ESTABLISH ECONOMIC IMPAIRMENT. WHY CAN'T OTHER REVENUES OFFSET THIS COST DISADVANTAGE?

A. The potential for "offsetting revenues" is effectively eliminated by an undisputed fact: mass market revenue opportunities are the same for both ILECs and CLECs. If revenue opportunities are the same and CLECs have higher costs as a result of need to backhaul all of their customers' loops and/or from the inability to fully realize the ILEC's economies of scale, ILECs will always be able to underprice the CLECs if they choose to do so. This is a point that cannot be ignored: an efficient CLEC that experiences a cost disadvantage cannot compete on price over time, and therefore cannot prudently invest in assets whose costs can only be recovered over an extended period of time.

Even if it could be shown a CLEC could use self-deployed local circuit switching to serve mass market customers in a given area at current retail prices, it could not rationally make the investment if it were also aware that it could be priced out of the market before recovering its investment.

In contrast, access to local circuit switching as a UNE, particularly because of its extremely important function of providing the CLEC access to voice grade local loops at the place where they are aggregated, puts ILECs and CLECs on a reasonably equal footing (the ILEC doesn't get an artificial competitive advantage as the first in, former monopoly provider). ILECs and CLECs can then compete based on the costs that they do control.

Q. DOES THE REGULATORY FLEXIBILITY ENJOYED BY THE ILEC IMPACT THIS EQUATION?

A. Yes. The ability of an ILEC to easily make price changes underscores the temporary nature of any market that is currently characterized by high prices and low costs. An ability to decrease the price charged to all mass market customers means that the ILEC can underprice a CLEC that has invested in its own local circuit switching facilities. An ability to target the price reduction only to those mass market customers that have been or are likely to be lost (through a so-called win-back offering, for example) puts the ILEC in an even better position: it can underprice the CLEC where necessary to recapture and retain customers, and can do so without incurring the cost of offering the price reduction to all customers in the area.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.