Schedule LLS-4 part 2

AT&T Corp.

Testimony filed in
Washington State Utilities and Transportation Commission
Docket No. UT-033044
"Triennial Review" proceeding

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. Collocation equipment includes the cross-connection frame (also known as a POTS bay) between the incumbent's MDF where the loops terminate and the CLEC's DLC equipment, the DLC equipment itself, and high capacity digital cross-connection frames ("DSX-1" or "DSX-3") necessary to manually cross-connect the digital output from the DLC to the transmission facilities that ultimately connect to the CLEC's remotely located switch. In addition, CLEC test access and monitoring equipment must be deployed in the collocation arrangement to allow the CLEC to properly operate its equipment.

As noted above, the CLEC DLC equipment, which is not normally required in the ILEC's network, receives analog communications from the loop and digitizes, concentrates and multiplexes the communications on the CLEC customers' loops to permit connection to the CLEC transport facility. The DLC also interoperates with the CLEC's switch to provide and receive the signaling necessary for call supervision, including the provision of loop current, ringing voltage and other basic loop interface functions. Thus, the DLC equipment is not only needed to extend the

CLEC's loops, it is also essential to providing loop current and ringing voltage 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 cross connection frame (i.e., the DSX panel) provides for this functionality by permitting the DLC to be manually cross-connected to the backhaul transport facility. DSX-1 panels allow for connections to DS-1 transport facilities, and DSX-3 panels allow 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 (rather than utilizing CLEC-provided transport), 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 fiber optic cable transport facilities. *See* **Exhibit RVF-7.**

Q. CAN DLC EQUIPMENT AND DSX EQUIPMENT BE INSTALLED IN A MANNER THAT GROWS SMOOTHLY, ON A LINE-BY-LINE BASIS 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 equipment 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 line, manufactured by Alcatel, can serve up to 2,016 POTS lines. Subtending equipment, referred to as a channel bank assembly, houses individual line cards and manages the interface between the analog lines and the DLC common equipment, facilitating 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, a CLEC would need one line card capable of serving up to four lines to serve a single POTS line, 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 a new common unit, a new channel bank assembly and a new line card.

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 (in the case of a DSX-1 panel) or a DS-3 (in the case of a DSX-3 panel) transport facility that extends the loops from the CLEC's collocation arrangement 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, the ILEC is not required to invest in this kind of transport for its own customers' loops.

In some cases, a CLEC's collocation will be connected to another collocation through the purchase of ILEC transport facilities (*e.g.*, DS1 and DS-3 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 RVF-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."[13]

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 DS-3s of capacity.[14] Twelve DS-3s are equivalent to 32,256 POTS lines, with a four-to-one DLC concentration ratio, which is greater than the number of loops that terminate in the majority of central offices.

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 RVF-5).

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

[13] *See* TRO at ¶ 361; *see also* TRO at ¶ 370.
[14] TRO at ¶ 388.

loops to their switches.[15] 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 have individual customer loops from the incumbent's network transferred to its collocation and ultimately to its switch. 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 my separate hot cut testimony, 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 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

[15] TRO, at ¶¶ 365-369.

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 serve 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.[16]

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

Q. PLEASE SUMMARIZE THE DIFFERENCES BETWEEN THE ILEC NETWORK ARCHITECTURE AND THE NETWORK ARCHITECTURE THAT CLECS MUST ADOPT TO SERVE CUSTOMERS USING UNE-L.

A. **Exhibit RVF-9** provides an overview of the CLEC network architecture required to collect and extend customers' loops from the ILEC wire center to the CLEC switch. The contrast with Exhibits RVF-3 and RVF-4, which show what is required for the ILEC to perform the same function by merely cross connecting a loop to a switch port using a jumper on the MDF, is clear.

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 equivalent to "equal access" in the long distance market. This is a process that AT&T has generically referred to as "electronic loop provisioning" ("ELP").

As discussed 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 Telecom 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 does not erase any of these problems that make the use of UNE-L for the mass market infeasible. Change is required -- and possible. 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. From a technical perspective, no carrier should be advantaged or disadvantaged with regard to how customers are physically connected to competing networks. The ILECs' current networks were designed to accommodate a single firm operating as a monopoly. They 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 when ILECs provision loops for themselves 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".

V. 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 by ILECs in offering service to mass market customers when the customer is served by loops on IDLC facilities.

IDLC can significantly limit a CLEC's ability to provide competing service if denied access to UNE-P because ILECs traditionally only offer access to customer's loops served by IDLC by physically removing the customer off of the IDLC facilities and reestablishing the customer's service on copper or UDLC facilities.[17] To serve these customers CLECs are therefore forced to have the ILEC transfer the IDLC loops to a spare copper pair if available, or to spare Universal DLC equipment if available (or to abandon the potential customer). Both service options are technically inferior, and normally incur additional CLEC costs. Transfer of a customer from IDLC involves dispatching an ILEC technician to the Serving Area Interface ("SAI"), removing the connection between the existing customer's copper distribution wire pair and the IDLC feeder terminations, and reconnecting the customer's copper distribution wire pair to either a spare copper feeder termination or to a derived feeder termination from UDLC remote terminal equipment. In addition, the central office end of the circuit must now be cross connected from the new analog copper or analog copper

[17] Some ILECs offer other alternatives such as switch "hairpinning" which are not being addressed here because of the limitations regarding of such options.

UDLC-derived loop feeder termination on the MDF to the CLEC collocation termination point in the central office.

As the above description indicates, IDLC can exacerbate impairment in two ways. The first way IDLCs further impairs a CLEC is by increasing costs and operational problems because of the required truck roll to move the IDLC loop to UDLC or copper technologies. The second impairment happens if and when the ILEC runs out of spare facilities that can be used to swap-out lines for customers that are on IDLC facilities and wish to change their local service provider. At that point, the CLEC is forced into being unable to serve customers whose loops pass through the ILECs choice of IDLC. This can be a significant problem in new housing developments or office buildings where IDLC loops are the only available transmission facilities for reaching the ILEC's customers.

Q. DOES THE MANNER IN WHICH CLECS MUST DEPLOY SWITCHES TO SERVE UNE-L CREATE ADDITIONAL IMPAIRMENT ISSUES?

A. Yes. 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. 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 CLEC 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 operational impairments such as inadequate subtending trunking from the ILEC's tandems to its end offices (See Exhibit RVF-9).

VI. CONCLUSION

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.

Q. PLEASE SUMMARIZE THE CRITICAL ISSUES 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 Commission 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 POTS to mass-market (residential and small business) customers using their own switches and ILEC-provided loops (i.e., UNE-L facilities-based entry). The barriers to which I refer relate primarily to the requirements that CLECs backhaul UNE-L traffic from the serving ILEC wire center to the CLEC switch.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, at this time.

Exhibit RVF-2

Understanding Competitive Loop Access
(Compact Disc - DVD)

Exhibit RVF-3

The Local Loop

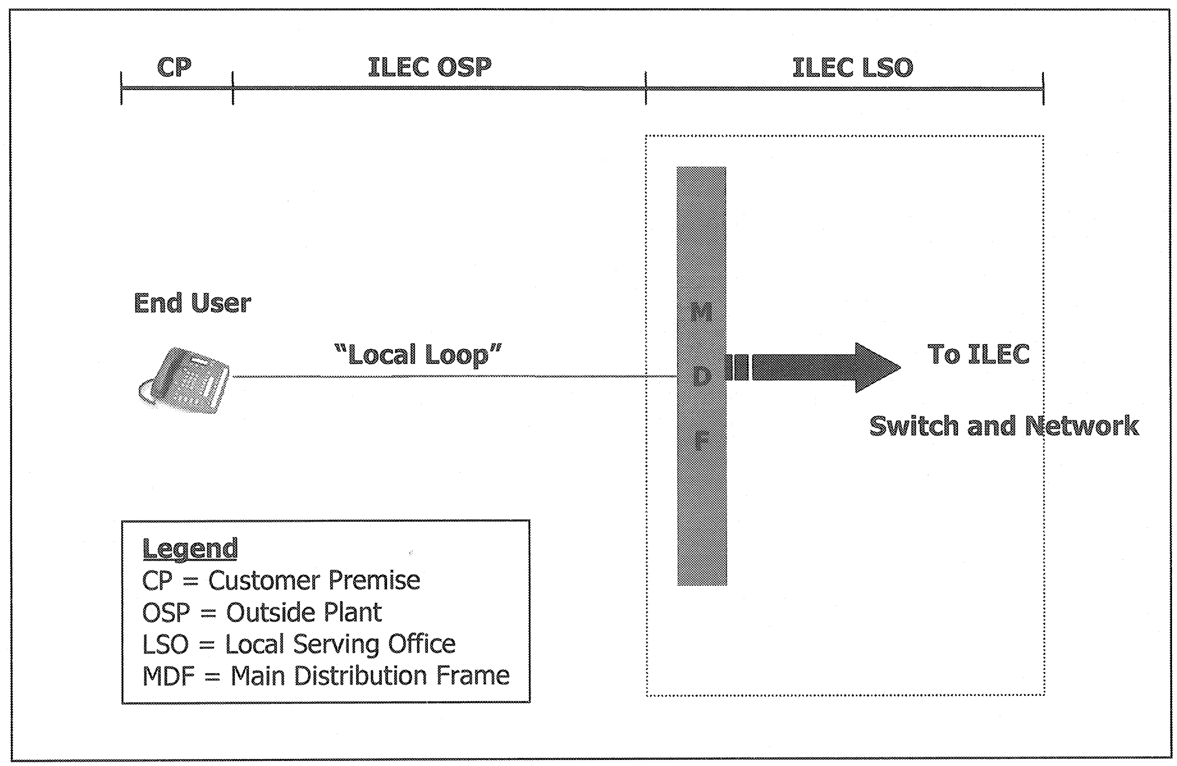


Exhibit RVF-4

A Distribution Frame

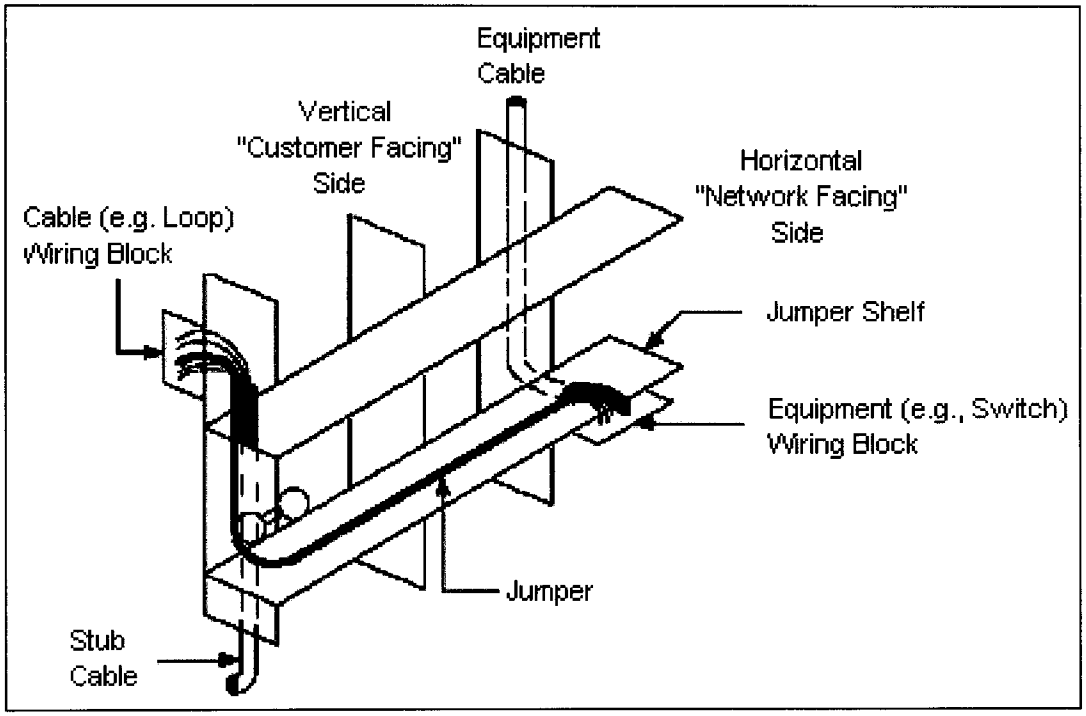
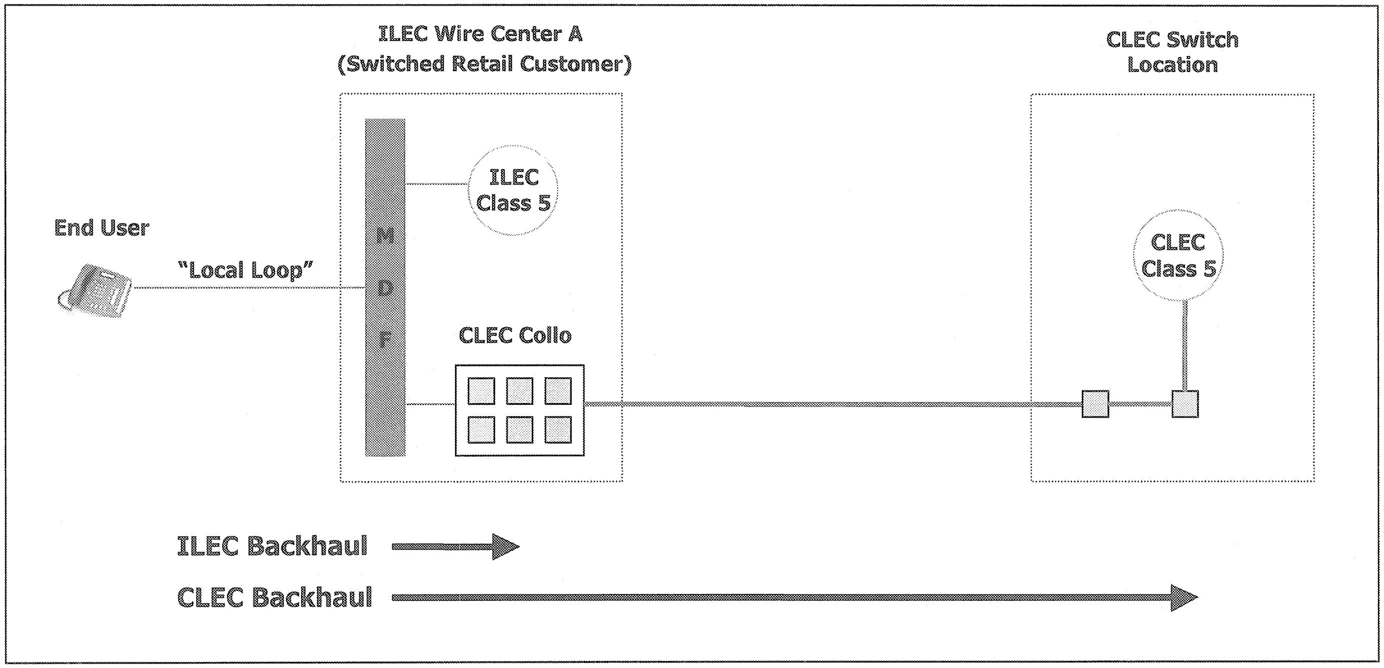


Exhibit RVF-5

Collocation and Backhaul



Collocation with ILEC Transport

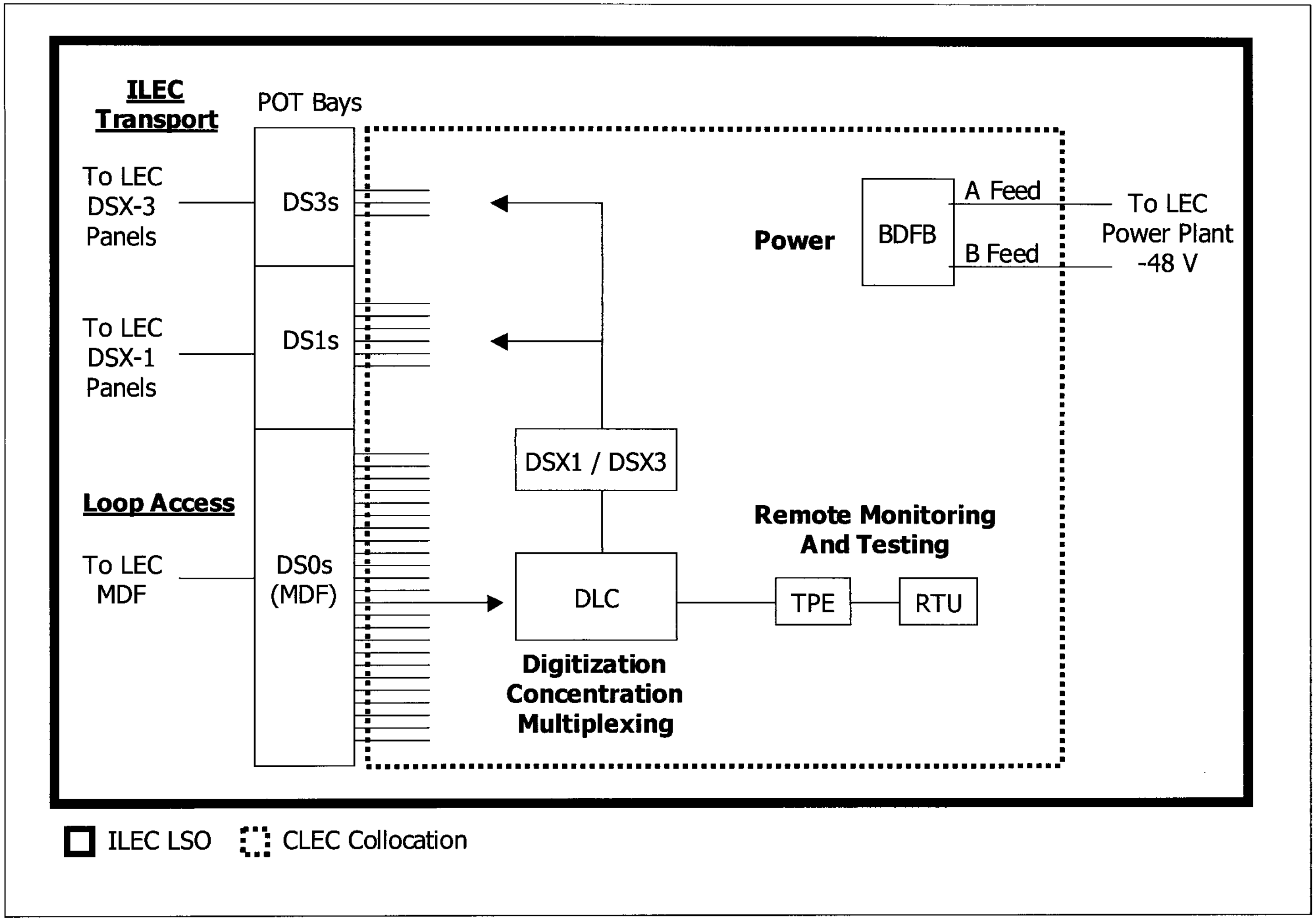


Exhibit RVF-7

Collocation with CLEC Backhaul

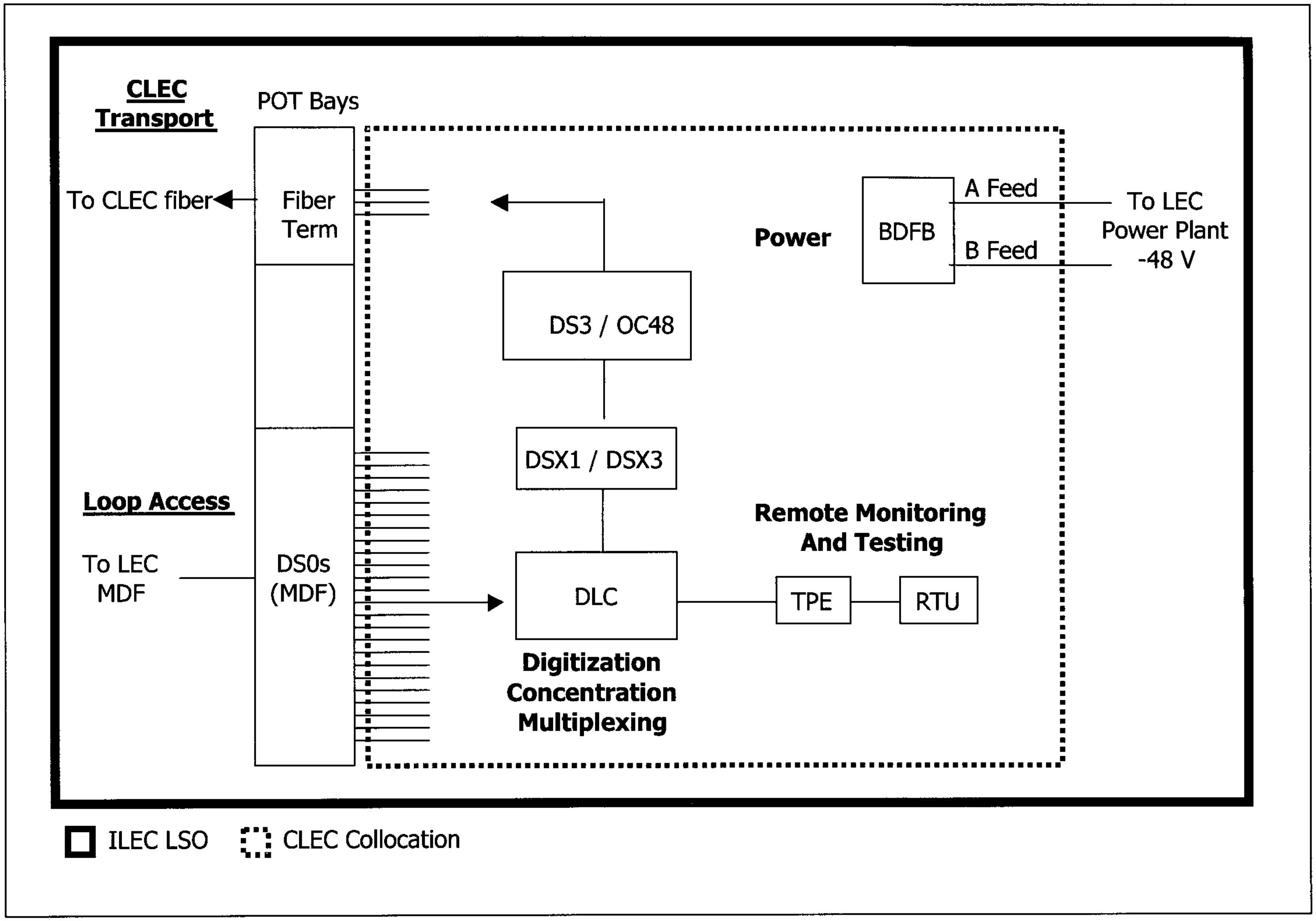


Exhibit RVF-8

Collocation Hubbing and Backhaul

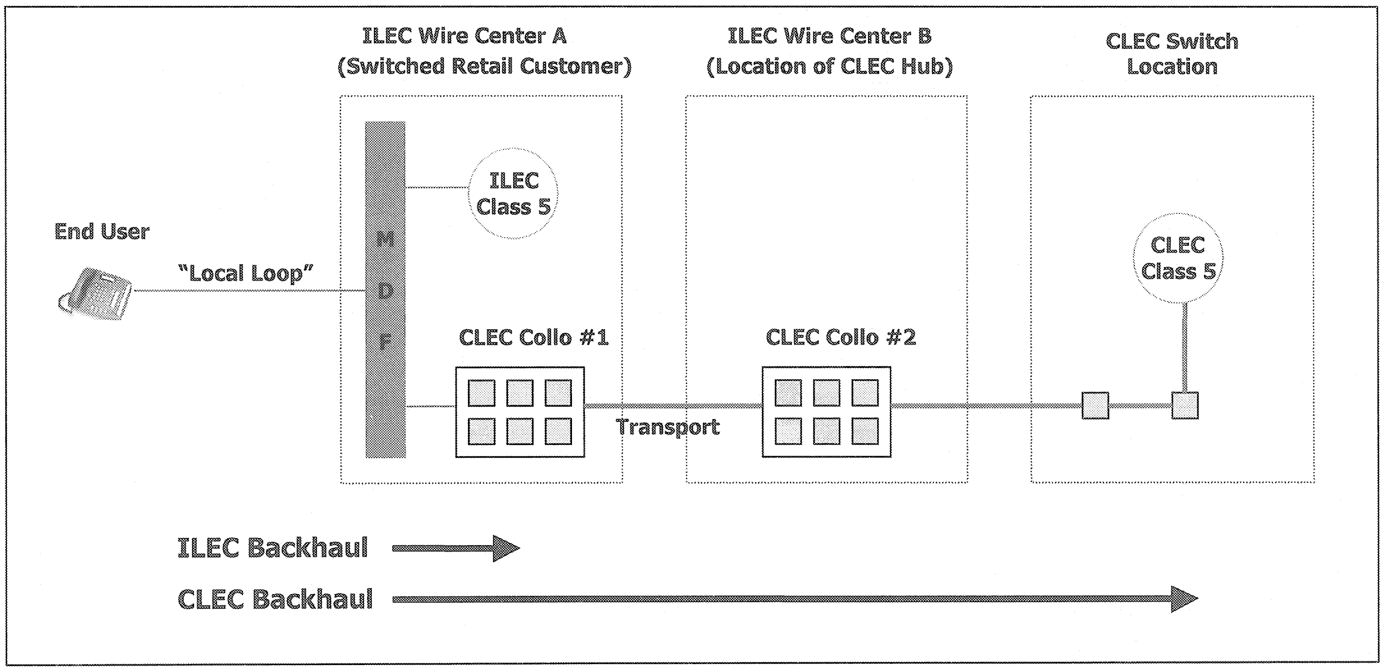
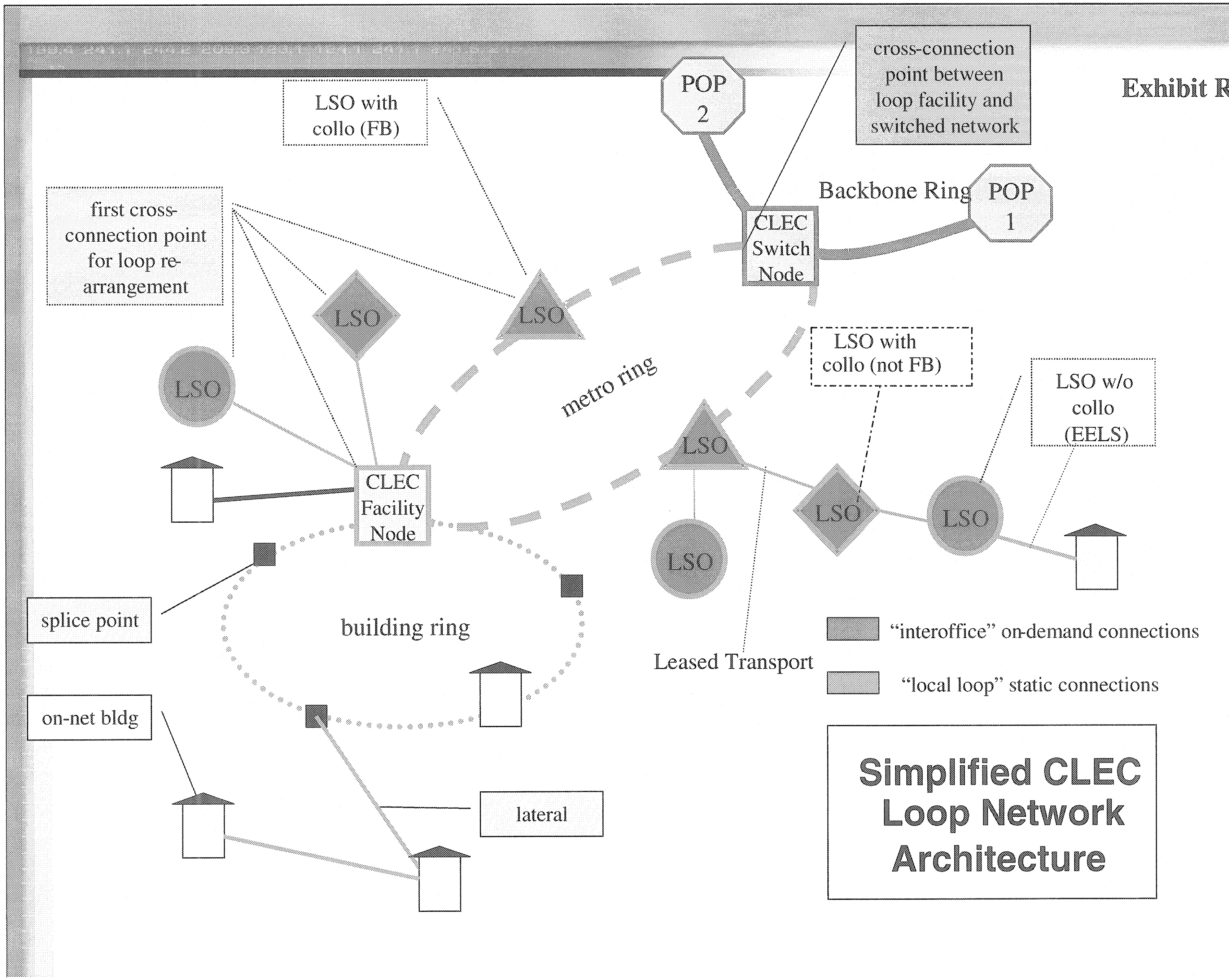


Exhibit RVF-9



Simplified CLEC Loop Network Architecture

Exhibit RVF-10

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.

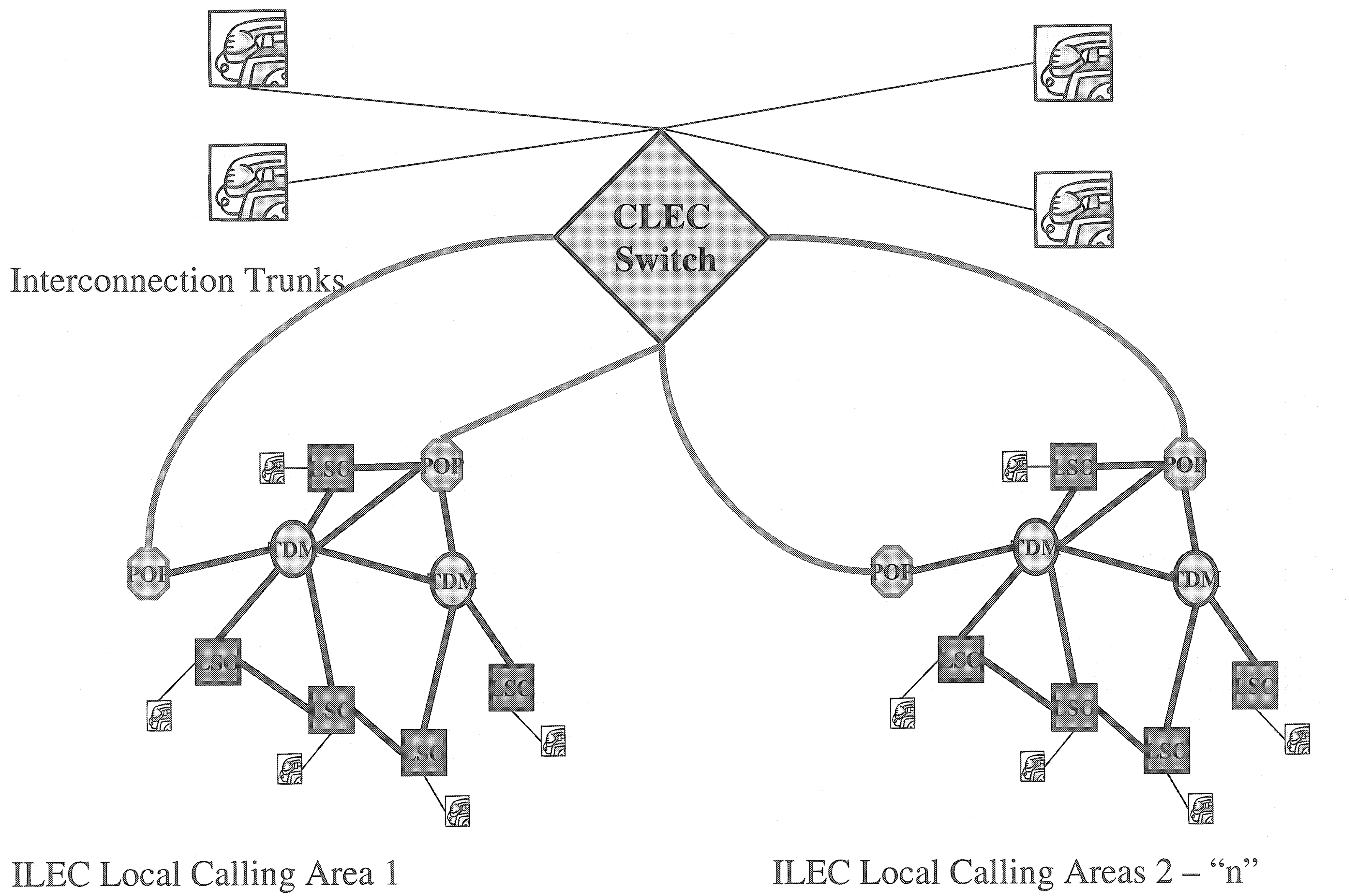


Exhibit DD-1T

BEFORE THE WASHINGTON STATE
UTILITIES AND TRANSPORTATION COMMISSION

In the Matter of the Petition of	**)**	
	)	**DOCKET NO. UT-033044**
QWEST CORPORATION	**)**	
	)	
To Initiate a Mass-Market Switching	**)**	
And Dedicated Transport Case	**)**	
Pursuant to the Triennial Review	**)**	
Order	**)**	

DIRECT TESTIMONY

OF

DOUGLAS DENNEY

AND

ARLEEN M. STARR

ON BEHALF OF

AT&T COMMUNICATIONS OF THE PACIFIC NORTHWEST, INC., AT&T LOCAL SERVICES ON BEHALF OF TCG SEATTLE, AND TCG OREGON
(COLLECTIVELY "AT&T")

DS0 COST TOOL

December 22, 2003

Table Of Contents

I. INTRODUCTION

DOUGLAS DENNEY

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Douglas Denney. I work at 1875 Lawrence Street in Denver, Colorado.

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

A. I am employed by AT&T as a Manager with Network Services, in the Local Services and Access Management group. My responsibilities include tracking, reviewing and analyzing local wholesale prices in Qwest's region; reviewing cost studies; and representing AT&T as a witness in state regulatory proceedings in the region relating to local wholesale price/cost issues.

Q. PLEASE DESCRIBE YOUR EDUCATION AND PROFESSIONAL BACKGROUND.

A. I received a B.S. degree in Business Management in 1988. I spent three years doing graduate work at the University of Arizona in Economics, and then I transferred to Oregon State University where I have completed all the requirements for a Ph.D. except my dissertation. My field of study was Industrial Organization, and I focused on cost models and the measurement of market power. I taught a variety of economics courses at the University of Arizona and Oregon State University. I was hired by AT&T in December of 1996 and have spent most of my time with the Company analyzing cost models.

I have testified before most commissions in Qwest's 14-state territory on cost models -- including the HAI Model, BCPM, GTE's ICM, U S WEST's UNE cost models, and the FCC's Synthesis Model. I have also testified about issues relating to the wholesale cost of local service -- including universal service funding, unbundled network element pricing, geographic deaveraging, and competitive local exchange carrier access rates.

ARLEEN M. STARR

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Arleen M. Starr. My business address is 1875 Lawrence Street, Denver, Colorado 80202.

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

A. I am employed by AT&T as a manager in the Local Services and Access Management organization. My responsibilities include analyzing local exchange carriers' intrastate costing and pricing methodologies and studies. As an expert witness, I have submitted testimony on local and access cost and price issues within AT&T's Western Region. I have previously submitted testimony in Arizona, Colorado, Idaho, Iowa, Minnesota, Montana, Nebraska, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington and Wyoming.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND.

A. I graduated from DePaul University in 1983 with a Bachelor of Science degree in Commerce, with an emphasis in Accounting. I received a Masters of Business Administration from DePaul University in 1990, with an emphasis in Finance. I have also completed various training seminars offered by AT&T and other educational organizations in marketing, economics, accounting, and costing methods in the telecommunications field.

Q. PLEASE DESCRIBE YOUR WORK EXPERIENCE.

A. I began my career with AT&T in 1984 in the Consumer Marketing Department. I had various responsibilities in this organization, including managing the expense and capital budgets. From 1986 to 1990, I held various positions in the Financial Regulatory Department in Chicago. My responsibilities included intrastate financial analysis and providing reports and data to the regulatory commissions in the Central Region. From 1992 to 1996, I worked in the product equipment business, with financial responsibilities in the product management, sales, and service areas. I assumed my current responsibilities in May of 1996.

II. <u>PURPOSE AND SUMMARY OF TESTIMONY</u>

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my Direct Testimony is to describe and quantify the significant cost disadvantages, as recognized by the Federal Communications Commission ("FCC") in the Triennial Review Order, 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.[1] To make this quantification, I employ the DS0 Impairment Analysis Tools ("Tools") developed by AT&T, and I explain why the Tools are the appropriate analytical framework to use in establishing the "cost disadvantage" for any efficient CLEC, describe how the Tools have been used to quantify that cost, and report the per line "cost disadvantage" quantified by the Tools for CLECS in each of Washington's three LATAs.

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. This Section, Section II, summarizes the remainder of this testimony and the range of the cost of impairment an efficient CLEC would incur if it were required to serve the mass-market using its own switches and Qwest's unbundled Loops ("UNE-L") in Qwest's operating territory in Washington. Section III provides an overview of the network architecture that would be deployed -- absent access to UNE-P -- by an efficient CLEC relegated to providing service using UNE-L to the mass-market and how that network architecture compares with the incumbent Local Exchange Carrier's ("ILEC's") network design. Section III also summarizes the cost impact of the CLEC's differing network design, how I have

[1] *In the Matter of Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, and Deployment of Wireline Services Offering Advanced Telecommunications Capability,* CC Docket Nos. 01-338, 96-98 & 98-147, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, FCC 03-36 (rel. Aug. 21, 2003) *("Triennial Review Order"* or *"TRO").*

quantified this cost differential using the Tools, and why the Tools are appropriate for determining an efficient CLEC's cost disadvantage vis-à-vis Qwest. Section IV explains in greater detail each tool that comprises the Tools. In doing so, Section IV makes extensive reference to the support documentation provided with the Tools and that are attached to my testimony. Given the extensive amount of support documentation provided, the operation of the Tools is only briefly described in this testimony. And finally, Section V, reports the CLEC per line "cost disadvantage" for each of Washington's three LATAs.

Q. PLEASE IDENTIFY ALL OF THE ATTACHMENTS TO YOUR TESTIMONY.

A. The exhibits to my testimony include:

Exhibit DD-2: DS0 Impairment Analysis Tools (DAS Exhibit 1).

Exhibit DD-3: DS0 Impairment Technical Appendix – describes in detail the operation of the separate workbooks that comprise the Tools (DAS Exhibit 3).

Exhibit DD-4: Inputs Documentation – validates the inputs used by the Tools (DAS Exhibit 2).

Exhibit DD-5: CLEC Cost Disadvantage Results for Washington LATAs No. 672, 674, and 676 (DAS Exhibit 4).

Exhibit DD-6: January 14, 2003 Ex Parte letter to Chairman Powell from James C. Smith, Senior Vice President of SBC.

Exhibit DD-7: 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.

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. Relying on the network architecture of an efficient CLEC, as described in the Direct Testimony of AT&T witness Robert V. Falcone, my testimony quantifies the cost disadvantages an efficient CLEC would confront in attempting to serve mass-market customers if continued access to unbundled local switching, hence UNE-P, was denied. Specifically, the analysis performed by the Tools described herein simply measures the minimum additional costs an efficient CLEC would incur if continued access to unbundled local switching was denied and the CLEC was required to serve the mass-market using its own switch and UNE-L. The Tools are employed to calculate the costs that CLECs would face in three broad categories: (1) preparation of the loop for transport from Qwest central offices (including DS0 equipment infrastructure and collocation); (2) the transport between the ILEC's central offices and the CLEC's switch; and (3) the customer transfer costs for hot cuts.

Based upon the calculations performed by the Tools, an efficient CLEC that uses self-provided switching and UNE-L would face <u>substantial</u> costs relative to Qwest in each geographic market served by Qwest. Those cost disadvantages range from a high of $ 15.06 per line per month to a minimum of $ 9.66 per line per month in Washington.

Q. WOULD THE COST DISADVANTAGES YOU CALCULATE RESULT IN THE CLEC BEING IMPAIRED IN ITS ABILITY TO PROVIDE SERVICE TO MASS-MARKET CUSTOMERS IN WASHINGTON?

A. Yes, based on the cost disadvantages described in this testimony, an efficient CLEC would face significant and insurmountable costs that are not incurred by Qwest and that I believe those costs would constitute a barrier to entry in Washington under any analysis.

III. BACKGROUND AND SUMMARY OF RESULTS

Q. DID THE FCC MAKE A NATIONAL FINDING WITH RESPECT TO MASS-MARKET CUSTOMERS?

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.[2] The FCC based its finding on the simple proposition that CLECs cannot use their own switches, in lieu of the ILECs' switches, unless they can connect their switches to their end-users' loops. Starting from the basic premise that an economic connection between the local loop and a CLEC switch is a condition of non-impairment in the absence of unbundled switching, 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 ILECs incur to do the same thing.[3]

[2] TRO at ¶¶ 422, 459.
[3] *Id.* at ¶¶ 479-481.

Q. HOW DID THE FCC CHARACTERIZE THE COST DISADVANTAGE THAT WOULD BE ENCOUNTERED BY CLECS?

A. The FCC recognized that the "absolute cost advantages" enjoyed by an ILEC can constitute a barrier to entry that would satisfy the impairment standard.[4] Citing evidence in the record, the FCC concluded 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 acknowledged the CLECs need to deploy equipment to "backhaul" the customer's loop to the CLEC switch in connection with UNE-L, stating "the need to backhaul the circuit derives from the use of a [CLEC] switch in a location relatively far from the end user's premises. This effectively requires competitors to deploy much longer loops than the incumbent."[6] The FCC also acknowledged that CLECs face additional costs to extend their customers' loops from collocations in the ILECs' serving offices to distant CLEC switches.[7]

Q. WHAT ARE THE ADDITIONAL COSTS THAT A CLEC WOULD INCUR TO SERVE ITS CUSTOMERS USING UNE-L?

A. As the FCC recognized, a CLEC seeking to serve mass-market customers using its own switches must first incur the costs for extending or "backhauling" a customer loop from the ILEC, here Qwest, central office(s) to the physical

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[4] *Id.* at ¶ 90.
[5] *Id*. at ¶ 479.
[6] *Id*. at ¶ 480.
[7] *Id*. at¶ 476.

locations where its switches are located. "Backhaul" is the process of connecting a UNE-L from a Qwest central office through the CLEC's collocation area in that central office to the CLEC's switch at a distant location. As described in Mr. Falcone's testimony, creation of this infrastructure necessarily entails: (1) preparation of the loop for transport out of the Qwest's wire centers, (2) transporting the traffic back to the CLEC's switch location, and (3) the cost to transfer service from the ILEC to the CLEC known as a "hot cut."

The cost to prepare the loop for transport out of Qwest's wire center includes the costs of collocation as well as the costs for Digital Loop Carrier ("DLC") and related transmission equipment (located in that collocation space) needed to prepare CLEC customers' traffic for efficient transport to the CLEC switches.

Next, the CLEC would incur the cost of the transport facilities needed to carry its UNE-L traffic from the collocation in the Qwest wire center to the CLEC's distant switch.

An efficient CLEC must also incur the costs associated with "hot-cuts." Hot-cut is a term that has been used to refer to the transfer of active customer service from Qwest's switch to a CLEC's switch.

Collectively, these costs are referred to as the CLECs' "backhaul infrastructure," and they represent costs that only CLECs must bear in order to provide service to mass-market customers using UNE-L. My analysis, therefore, includes all of these cost components in calculating the minimum cost disadvantages an efficient CLEC would face.[8]

Q. HOW DOES THE CLEC NETWORK DESIGN DIFFER FROM QWEST'S NETWORK DESIGN?

A. As discussed above and in the Network Architecture testimony of Robert V. Falcone, in order to extend customer loops to its switches, a CLEC must establish collocation space in each Qwest wire center where it seeks to provision service. It must install and maintain DLC equipment in each Qwest central office where the customer's analog loops (voice grade UNE-loops) are located. This DLC equipment is used to digitize, concentrate, and multiplex the traffic delivered over these analog loops to permit efficient backhaul from the Qwest central office where the customer's loop terminates to the distant CLEC switch, without substantially reducing the quality of the customer's voice service.

In addition, the CLEC must transport the UNE-L traffic back to its switch. It must then arrange for, and pay Qwest's charges for a hot cut.

In contrast, Qwest connects its loops and switching using a simple, inexpensive copper wire pair cross-connection in the central office where its loops terminate.

[8] There are additional costs associated with the CLEC's use of its own switch and interoffice transport that must be considered in the overall cost of providing service to mass-market customers using UNE-L. These costs are not addressed in this analysis but are reflected in the business case analysis presented by AT&T in the Direct Testimony of Michael Baranowski.

Thus, Qwest's "backhaul" network consists of only a relatively short pair of jumper wires.

Q. DO YOU HAVE DIAGRAMS THAT COMPARE THESE TWO NETWORK ARCHITECTURES?

A. Yes. Figure 1 depicts Qwest's method of loop connectivity. Figure 2 depicts the equivalent facilities required by an efficient CLEC to achieve this same level of connectivity.

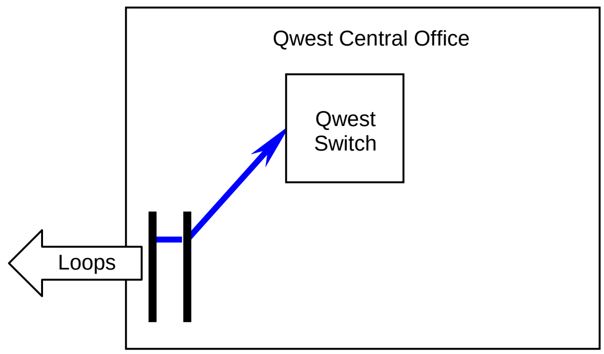

Figure 1 – ILEC Serving Arrangement

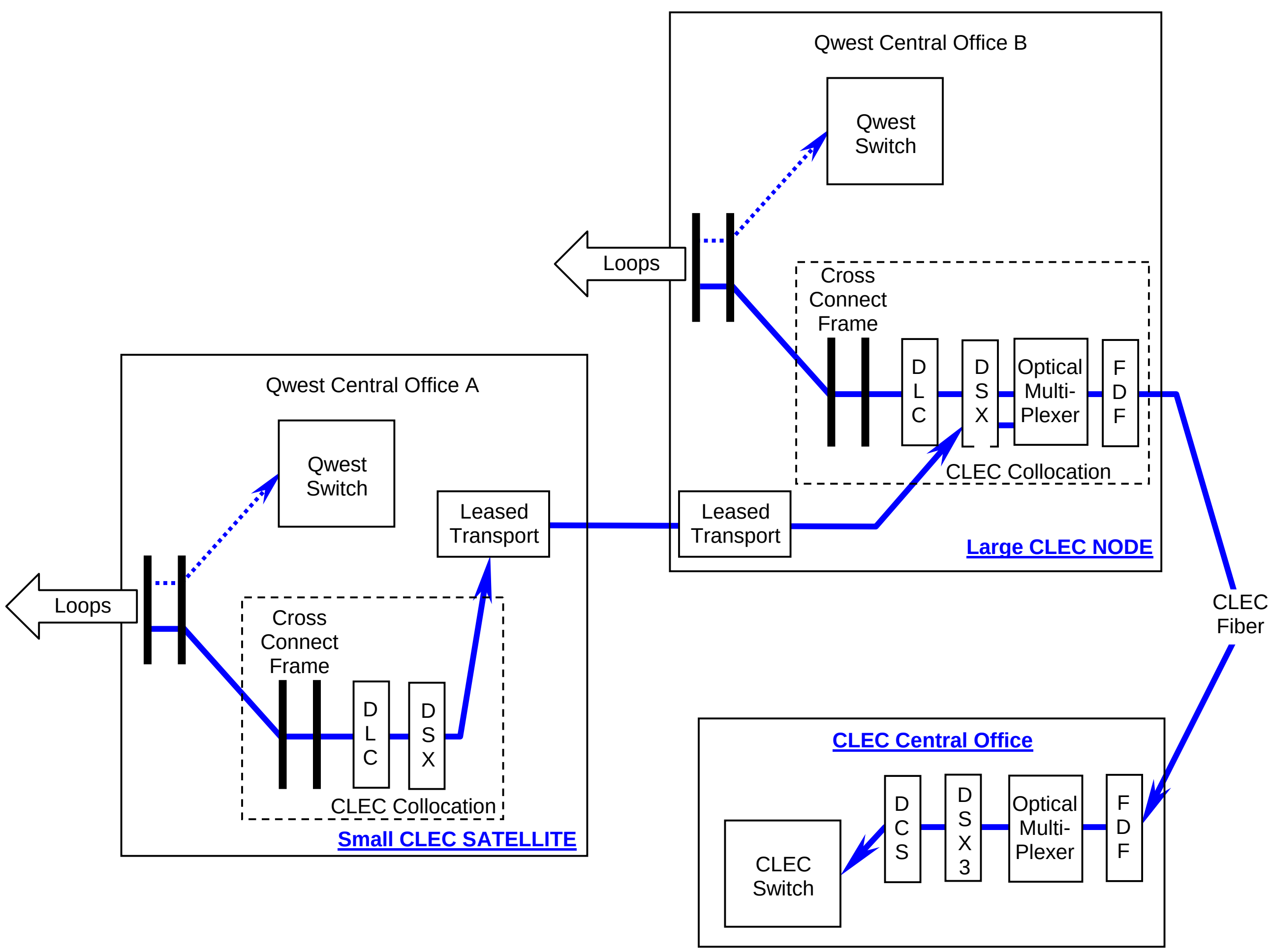

Figure 2 – CLEC Serving Arrangement

Figure 2 traces the facilities that an efficient CLEC must deploy to connect a customer's loop to its switch (*i.e.*, the solid blue lines running from Qwest Central Office A to Qwest Central Office B, and from Qwest Central Office B to the CLEC Central Office switch location). These facilities are significantly more extensive, hence costly, than the facilities Qwest needs to perform the same functions, *i.e.*, the blue line in Figure 1, running between the vertical and the horizontal sides of the Main Distribution Frame ("MDF").

The basic network diagram in Figure 2 will be used again in Section IV, where I will highlight the specific components of the network that correspond with each of the Tools and the costs they produce.

Q. DO THESE DIFFERENCES IN NETWORK DESIGN CAUSE CLECS TO INCUR HIGHER COSTS THAN QWEST TO PROVIDE SERVICE TO MASS-MARKET CUSTOMERS?

A. Yes. The crucial economic fact is that the cost the CLEC incurs to backhaul the UNE-L traffic to the CLEC switch and to effectuate hot cuts are not incurred by Qwest, whose "backhaul" network consists of only a simple set of jumper wires and no additional electronic devices.

Collectively, an efficient CLEC's costs associated with collecting and backhauling its customers' loops to its switch create a substantial barrier to market entry in Washington. This backhaul disadvantage also represents a significant component of Qwest's contribution margin that would be insulated from competitive pressures, even if efficient CLECs actually entered these markets in the face of such a disadvantage.

Q. HOW HAVE YOU QUANTIFIED THE COST THAT THE EFFICIENT CLEC WOULD INCUR PROVIDING SERVICE TO THE MASS-MARKET USING UNE-L VIA THIS NETWORK DESIGN?

A. I have employed certain analyses, the "DS0 Impairment Tools," to quantify the *additional* costs of loop connectivity incurred by CLECs, but not by Qwest, if CLECs are required to provide facilities-based mass-market local services using UNE-L, attached as Exhibit DD-2. Specifically, the Tools are designed to quantify the minimum additional equipment and network functionality that an efficient CLEC would need to, in essence, *extend* a UNE -L obtained from a Qwest central office to its own switch.

In performing this analysis, I have followed the FCC's admonition not to examine results for a specific CLEC; instead, my analysis focuses on an efficient CLEC. I also have made a conscious effort to be conservative, as described further herein, with respect to inputs and assumptions.

Q. WHAT EXACTLY ARE THE TOOLS?

A. The Tools are three workbooks, each comprised of a collection of spread sheets that calculate the cost that an efficient CLEC would have to employ to serve the mass-market absent access to Qwest's local switching UNE. These three workbooks are the Facility Ring Processor, the Transport Impairment Analysis

Tool, and the DS0 Impairment Analysis Tool workbook, collectively the "DS0 Impairment Analysis Tools" or the "Tools". Each tool/workbook is explained in greater detail in Section IV. The output or result produced by the third of these workbooks, *i.e.*, DS0 Impairment Analysis tool workbook, is the efficient CLEC's "cost disadvantage."

Q. THE FCC CRITICIZED THE COST ANALYSES THAT WERE PRESENTED BY SEVERAL PARTIES, INCLUDING AT&T, IN THE TRIENNIAL REVIEW ORDER. HAS AT&T ADDRESSED THE FCC'S CRITICISMS IN THE TOOLS YOU ARE PRESENTING IN THIS PROCEEDING?

A. Yes. While acknowledging the existence of substantial cost disadvantages, the FCC stated that the cost studies presented to the FCC failed to provide sufficient evidence 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.[9] According to the FCC, the studies either failed to adopt the proper framework for determining impairment, were insufficiently granular, or failed to provide sufficient support for the parameters they employed. Some of the specific criticisms raised by the FCC were that:

> the cost estimates depend on the competitor's predicted market share in each incumbent end office and the size of the end office, as well as on the cost of various UNEs and equipment, some of which were disputed. The cost estimates were also sensitive to whether or not the competing carrier was assumed already to have

[9] TRO at ¶ 483.

> installed facilities, such as collocation, transmission equipment and backhaul, a switch, and/or their own transport network, for the purpose of providing other services – for example, to serve the medium and large enterprise market. The studies failed to provide sufficient support for many of these parameters, and often failed to take into account geographic variations in these parameters. While providing significant evidence that competitors operate at a cost disadvantage compared to the incumbent, the studies presented by WorldCom and AT&T also did not adopt the proper framework, because they failed to consider all revenue opportunities associated with entry. These studies were therefore unable to determine when entry would be uneconomic. The incumbent LEC studies also used incorrect revenues, failing to use the likely revenues to be obtained from the typical customer. Moreover, all of the studies relied on averages, either national or regional, for some of their revenue and cost parameters, despite the fact that a granular analysis must wherever possible account for market-specific factors. Accordingly, based on the foregoing, the studies provide insufficient evidence either for or against a finding of impairment.[10]

As will be discussed in further detail herein, the Tools rely on granular, state-specific data for those costs that vary by state. For costs that do not vary by state, the Tools rely on national and market-based data. In all cases, AT&T has provided extensive support for the costs used in the Tools in the attachments to this testimony.

Further, the Tools account for an offset for facilities that are utilized to serve the enterprise market. And finally, the results of the Tools are an input into the "business case" analysis,[11] so the revenue opportunities associated with entry can be examined in connection with these cost disadvantages.

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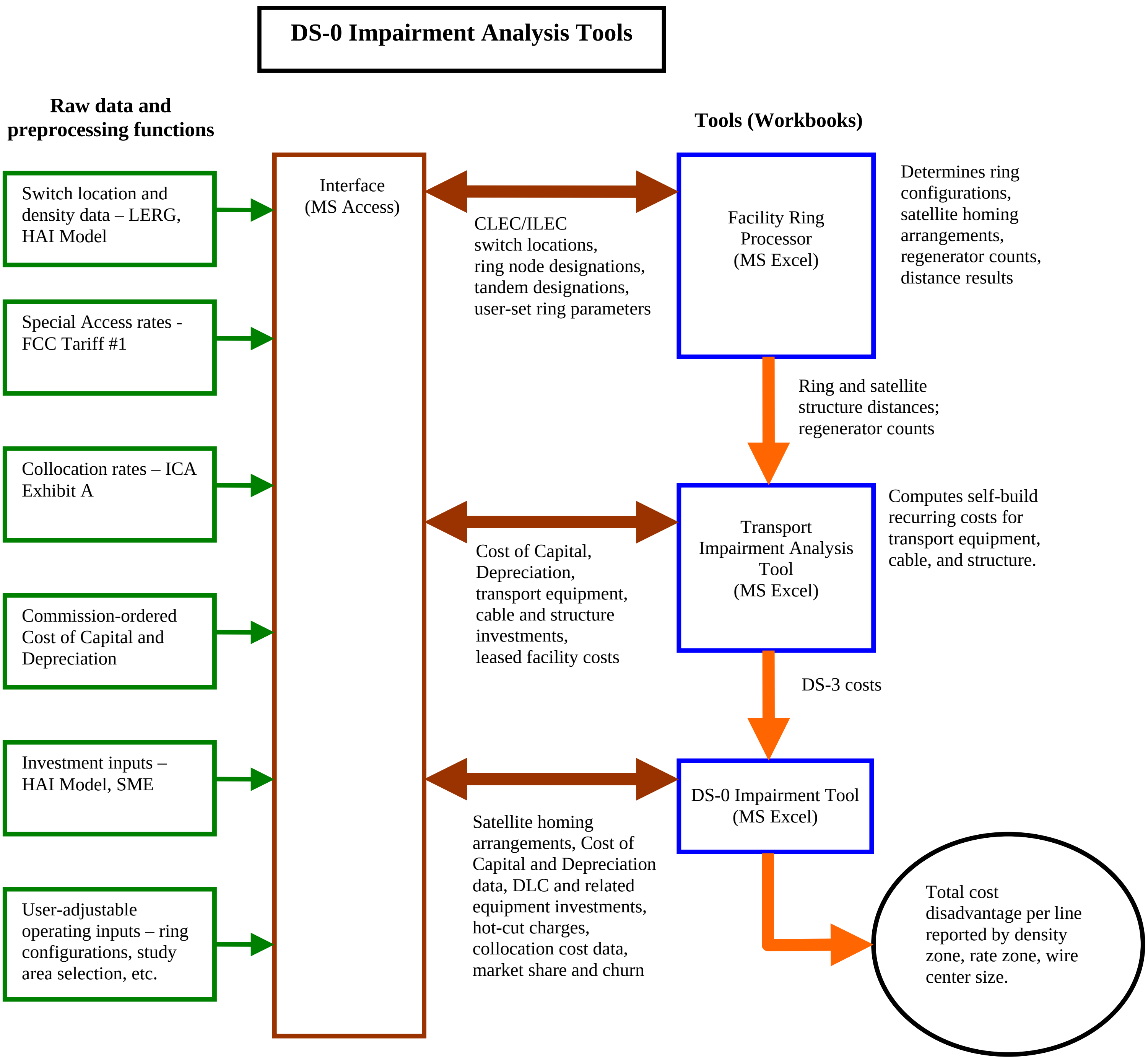
[10] *Id*.
[11] As described further in the Direct Testimony of Michael Baranowski.

Q. PLEASE PROVIDE A SCHEMATIC OF THE ANALYTICAL FRAMEWORK USED TO CONDUCT THE ANALYSES.

A. Figure 3 below depicts the entirety of the analytical framework, for what the Tools ultimately produce – the CLEC cost disadvantage. The Figure shows how the inputs and outputs of the Tools map to each other.

1 **FIGURE 3: ANALYTICAL FRAMEWORK FOR DS0 IMPAIRMENT.**



Q. PLEASE DESCRIBE BRIEFLY THE FRAMEWORK DEPICTED IN FIGURE 3.

A. Because the purpose of the Tools (and the focus of this testimony) is to quantify the *additional* costs of loop connectivity – incurred by an efficient CLEC, *but not incurred by Qwest* – the framework is best understood by beginning with the results of the analysis represented by the black circle in the lower right corner of Figure 3.

Mapping backward from right to left on Figure 3, the 3 workbooks/Tools (blue boxes) calculate the costs that efficient CLECs face for the backhaul infrastructure described above.

The User Interface, depicted in the middle of Figure 3, is a module that:

a. controls the operation of the individual Tools;

b. provides a user interface which allows users to adjust input values and select Tool execution options; and

c. contains tables consisting of all input data, including wire center locations, equipment investments, economic lives, and other parameters required by the Tools.

At the left side of Figure 3, categories of raw data and cost inputs are listed (in green boxes). These data are based upon 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 5 year multi-year term plans). Where costs are not based upon tariffed or Commission-ordered rates, such as those contained in Appendix A to Qwest's Interconnection Agreement, market-based costs or costs that are based upon the experience and judgment of individuals that have expertise in the field are employed. The accompanying Technical Appendix and Inputs Portfolio, Exhibits DD-3 and DD-4, provide: 1) more detailed descriptions of the framework and operation of the Tools; and 2) support for the inputs used in the analysis.

Q. WHAT IS THE CONFIGURATION OF COST DISADVANTAGE THAT IS PRODUCED BY THE DS0 IMPAIRMENT ANALYSIS TOOLS?

A. A synopsis of the configuration and range of cost disadvantage in Washington is presented in Table 1 below.[12]

Table 1: Range of Cost Disadvantage in Washington

	LATA	Wire Center	UNE Zone
Highest Cost	$15.06	$93.71	$17.03
Lowest Cost	$ 9.66	$ 8.11	$ 8.15

Table 1 shows that the results of the analyses can be configured by LATA or by wire center and that the range of cost disadvantage can be depicted for rural or urban areas as well.

Q. WHAT DOES THIS IMPAIRMENT DOLLAR RANGE REPRESENT?

A. The cost range described above provide a shorthand basis – and a conservative one at that - for supporting a general finding of economic impairment in Washington, consistent with the FCC's national finding of impairment. An

[12] *See also* Exhibit DD-5.

important characteristic of impairment is that the number of customer lines a CLEC serves in a given Qwest central office (as distinct from the total lines in a given central office) is a key determinant of the cost disadvantage. Thus, the cost disadvantage of 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 Qwest central office (*i.e.*, whether it is a "Network Node" or "Satellite" office, *see* infra.).[13] 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 cost disadvantage that would allow for mass-market competition. Thus, even if a CLEC serves a very substantial number of lines in an individual central office in Washington, the minimum cost impairment per line would nevertheless constitute a cost penalty that is competitively disqualifying under any reasonable measure.

In addition, because the Tools do *not* calculate the total additional costs that would be incurred by an efficient CLEC to provide service in Washington, the estimate represents the minimum cost disadvantage that would be incurred by an efficient CLEC. For example, this analysis does not include the higher

[13] "Network Nodes" are larger CLEC collocation offices that are connected with other CLEC Network Nodes using self-provided SONET ring transport. Smaller ILEC central offices are referred to as "Satellite Offices" and are connected to their nearest CLEC Network Nodes via leased DS-1 or DS-3 transport.

acquisition costs CLECs face as compared to Qwest.[14] Nor does the analysis include the costs of the local switching and interoffice transport. These costs, however, are considered in the "business case" analysis presented by AT&T witness Mr. Baranowski.

Q. WHY DO YOU SAY THIS RANGE OF COST DISADVANTAGE IS "CONSERVATIVE"?

A. First and foremost, this range of cost disadvantage is conservative because of the conservative nature of the inputs used in the Tools. The conservative nature of the inputs data is evidenced by the working assumption that an efficient CLEC would enter the market using a facilities-based, voice grade UNE-L architecture. As a result, the Tools calculate the minimum level of cost disadvantage an efficient CLEC would incur. Said differently, even if an efficient CLEC had 100% of the market and the hot cut charge was $0.00 in any central office, there still remains the cost associated with having to build this type of network architecture absent ongoing access to Qwest's local switching UNE.

Second, the Tools assume utilization in the efficient CLEC network is "ideal." That is, certain of the tools allocate the appropriate percentage of network costs to the mass-market (based on "ultimate" demand) and the remainder of the costs are assigned to the so-called "enterprise" market. In simple sum, it does not allow for

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[14] TRO at ¶ 471.

under-utilization of the network – an assumption that clearly errs on the side of Qwest.

Q. IS THE COST DISADVANTAGE FOR CLECS CALCULATED BY THE TOOLS SIMILAR TO THAT CALCULATED BY ANY ILEC?

A. Yes. It is remarkably similar, which should give the Commission confidence in the results produced by the Tools. The types of costs and the general levels of impairment I have identified are consistent with calculations submitted by ILECs during the TRO proceeding. In January 2003, for example, SBC Communications, Inc. ("SBC") submitted an Ex Parte letter to Chairman Powell that addresses the CLEC cost to provision mass-market service using UNE-L.[15] This letter is appended as Exhibit DD-6 to my testimony. Exhibit DD-6 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."[16]

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:

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[15] Ex parte letter to Chairman Powell from James C. Smith, a Senior Vice President of SBC, dated January, 2003 in CC Docket Nos. 01-338, 96-98, and 98-147 ("SBC Ex Parte").
[16] *Id.*, p. 1.

- 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);[17]
- the costs of collocation;[18]
- the costs of GR-303 concentration and multiplexing equipment;[19] and
- transport costs.[20]

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.[21] 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.

[17] *Id*. at 3.
[18] *Id*. at 4-5.
[19] *Id*. at 5.
[20] *Id*. at 7.
[21] *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 DD-7.

IV. THE DS0 IMPAIRMENT ANALYSIS TOOLS

A. Overview

Q. PLEASE PROVIDE A MORE DETAILED EXPLANATION ABOUT THE ANALYSIS PERFORMED BY THE TOOLS.

A. Certainly. Because UNE-L entry requires CLECs to connect Qwest loops to the CLEC's 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 Tools 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 Qwest in Washington. The analyses reflect the anticipated experience of an efficient CLEC that seeks to broadly serve the mass-market using UNE-L, rather than focusing on the business strategy of any particular competitive carrier.

Q. PLEASE DESCRIBE THE TOOL WORKBOOKS AND HOW THEY ARE LINKED TOGETHER TO PERFORM THE ANALYSES.

A. The Tools, Exhibit DD-2, are three workbooks, each consisting of a number of spreadsheets that calculate or quantify the cost associated with connecting a customer's loop that terminates in Qwest's central office to an efficient CLEC's switch, along with hot cut costs.

The first of these workbooks, the Facility Ring Processor ("FRP"), determines the transport facilities that are required to connect collocation arrangements where unbundled loops are collected and transported back to the CLEC switch. This tool essentially identifies the transport architecture that is needed to establish connectivity between a customer's loop (that terminates in Qwest's central office) and an efficient CLEC switch.

Next, the Transport Impairment Analysis Tool ("Transport Tool") uses the results produced by the FRP to calculate the transport cost per DS-3 as a function of the number of DS-3s active at a Network Node (a collocation appearing on a CLEC fiber ring that is used to provide service to customers).

Finally, the cost developed by the Transport Tool is used by the third workbook, the DS0 Impairment Analysis Tool workbook, to compute the transport component of the cost disadvantage. In addition to the transport costs, the DS0 Impairment Analysis Tool workbook also 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 cost disadvantage/impairment per line for each LATA in Washington. These results are contained in Exhibit DD-5.

Q. DO THE TOOLS CALCULATE THE TOTAL COSTS THAT A CLEC WOULD INCUR TO PROVIDE SERVICE TO A CUSTOMER?

A. No. As briefly discussed above, it is important to emphasize that the Tools quantify only certain significant components of the cost disadvantage that would be faced by an efficient CLEC using UNE-L, as compared to Qwest. The Tools do *not* calculate the total additional costs that would be incurred by an efficient CLEC to provide service in Washington. For example, a CLEC's costs to acquire customers are appreciably higher than Qwest's, particularly when the likelihood of price discounting is considered.[22] Likewise, customer service is most efficient only for large customer groups. These cost factors, plus the costs of the local switching and interoffice transport are considered in the "business case" analysis presented by Mr. Baranowski.

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

A. Yes, there are four important sets of assumptions inherent in the Tools:

1) The % market share of mass-market customers an efficient CLEC is expected to achieve is assumed to be 5% per wire center;
2) The CLEC will acquire this market share per wire center in five years;

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[22] TRO at ¶ 471.

3) Transport costs will be defrayed by both enterprise and mass-market customers, which has the effect of reducing the backhaul transport cost component of impairment; and

4) Estimates of customer "churn," *i.e.*, how long an efficient CLEC can expect to keep a customer that it "wins" from the ILEC or another CLEC is assumed to be 4.6%.[23]

To expand on one of the points made above, the Tools assume that an efficient CLEC will benefit by serving both enterprise and 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. The Tools deploy self-provided facilities between large Qwest offices, and assume that these facilities are also utilized to transport mass-market traffic. Thus, the calculations described here assume that an efficient 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 Qwest offices. Apportioning the costs of node-to-node transport between mass-market and enterprise customers is one of many ways that the 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.

[23] Banc of America Securities, April 30, 2003, page 10.

B. Costs of Preparing Loops for Transport Out of Qwest's Central Office(s).

Q. PLEASE REITERATE THE COSTS ASSOCIATED WITH PREPARING A CUSTOMER LOOP FOR TRANSPORT OUT OF A QWEST CENTRAL OFFICE.

A. As noted earlier, there are two major components of the cost of preparing the signal for transport out of the central office: (1) the cost of digital loop carrier (DLC) and related equipment housed within Qwest's central office; and (2) the CLEC's cost to obtain collocation space in each Qwest central office in which to place the DLC and related equipment. Each of these is discussed in more detail below.

1. DLC Systems and Facility Terminating Equipment.

Q. WHAT CATEGORIES OF EQUIPMENT ARE INCLUDED IN THIS PORTION OF THE COST ANALYSIS?

A. The principal types of equipment required by an efficient CLEC to provide voice grade services using UNE-L are:

(1) Digital loop carrier (DLC) equipment: necessary to digitize, multiplex and concentrate the traffic for individual voice grade loops at the originating Qwest central office and the corresponding equipment at the location of the CLEC switch; and

(2) Facility terminating equipment: cross-connection frames within the CLEC's collocation facilities in each Qwest central office on which

> incoming voice grade loops terminate, out-going transport facilities terminate, and equipment cross-connections are made.[24]

Q. CAN YOU POINT TO THIS PORTION OF CLEC COSTS ON THE NETWORK DIAGRAM?

A. Yes. Figure 4 below highlights the equipment under study in red (the equipment in the dashed line box in Box A labeled Cross Connect Frame and DLC). These pieces of equipment are located within the CLEC collocation area (more about collocation cost per se later).

[24] The testimony submitted by Robert V. Falcone contains diagrams depicting the various DLC configurations used in the DS0 impairment calculations.

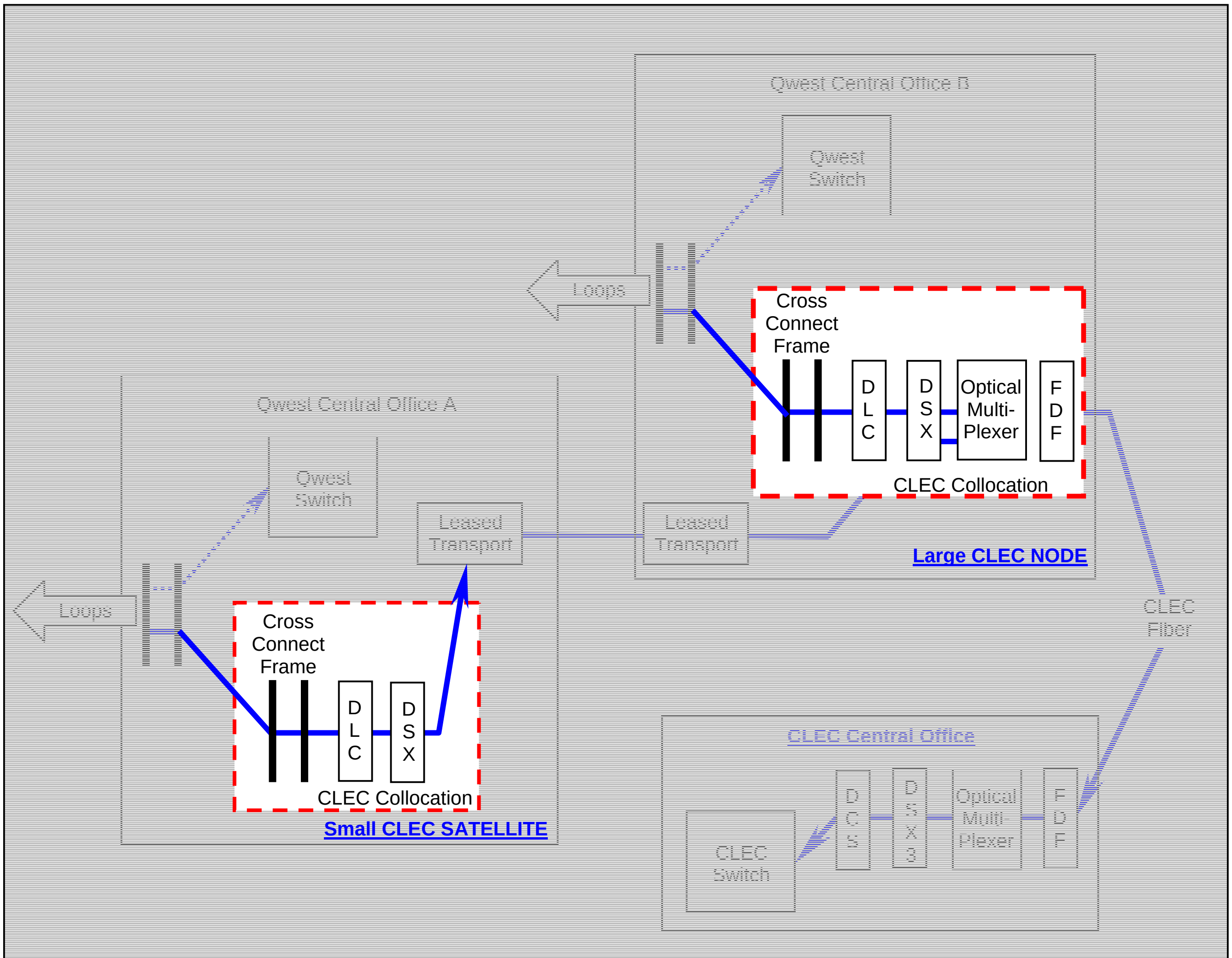

Figure 4 Location and Cost of DLC and Terminating Equipment

Q. HOW DO THE TOOLS SIZE DLC AND ITS SUPPORTING INFRASTRUCTURE?

A. Preliminarily, DLC equipment consists of a set of circuit boards and the shelves necessary to hold them. They are manufactured in standard line sizes. Complete

"DLC systems" are modular, that is subscriber capacity can be added (or subtracted) in standard increments as demand necessitates.

The Tools size the required DLC and supporting infrastructure on the basis of the number of lines an efficient CLEC is expected to serve out of a given wire center. For each wire center, the Tools select the lowest cost investment option from among three standard DLC sizes.[25] Because the frame space required to house the modules and common units is known (*i.e.*, vendors publish these physical specifications for their equipment), the DLC frame requirements can be calculated for each office according to the DLC size selected.

A similar approach is used to establish the number of cross-connection panels (and corresponding frames required) to provide a connection between Qwest's MDF and the DLC equipment in the CLEC's collocation area for the lines acquired in a central office by the CLEC. That is, each cross-connection panel has a fixed capacity for terminations and consumes a known amount of frame space.[26] The number of lines served determines the number of terminations and the number of required cross-connection panels can be calculated. The number of cross-connection panels, in turn, determines the number of required frames.

Once the quantity of DLC and supporting equipment required in a given central office is determined, the Tools compute the installed cost of this equipment using

[25] Manufacturers' specifications for this equipment are contained in the Inputs Portfolio, Exhibit DD-4.
[26] Manufacturers' specifications for this equipment are contained in the Inputs Portfolio, Exhibit DD-4.

inputs described in more detail in the Technical Appendix. The sum of all of these investment components represents the gross infrastructure investment for the central office under study.

Q. PRESUMABLY CLECS WOULD ACQUIRE CUSTOMERS OVER TIME. DO THE TOOLS PROVIDE A RAMP-UP MECHANISM?

A. Yes, for some 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 handle several years of demand because it is prudent, economically, to install the type of DLC common units that will be required over time, rather than to start with smaller units and then replace them with larger ones over shorter periods. The Tools, therefore, select the appropriate DLC equipment and the corresponding cross-connect panels and frames based on the *final* CLEC market share and line count assumed to be acquired by the efficient CLEC in the study. However, because of the size and variable nature of line card investment, the Tools add line card investment as needed as additional line card demand materializes. 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 stages of CLEC entry than in latter periods, when market share has matured and stabilized. In addition, the Tools provide for a sizeable deferral of the line card investments to future periods.

Q. WHY IS IT APPROPRIATE TO INCORPORATE A "RAMP UP"?

A. The Tools incorporate a ramp-up mechanism that assumes that an efficient CLEC reaches a market share of 5% of the end users served in a given central office over a period of 5 years. This reflects a balance of operational considerations and business experience regarding the speed with which an efficient CLEC could efficiently grow its customer base. Such a profile reflects the general experience of new market entry. That is, demand starts at zero, increases to close to the ultimate level in the first few years, and then flattens out for the remainder of the study period.[27]

2. Collocation Costs.

Q. PLEASE HIGHLIGHT THE RELEVANT PORTIONS OF THE CLEC NETWORK ARCHITECTURE RELATED TO THE COST OF COLLOCATION.

A. Figure 5 below highlights in red (the equipment within the dashed line box in Box A) the portion of the CLEC network architecture that corresponds to the calculation of collocation costs incurred by the CLEC that is quantified in my analysis.

[27] *See* Direct Testimony of William H. Lehr and Lee L. Selwyn, fn 32.

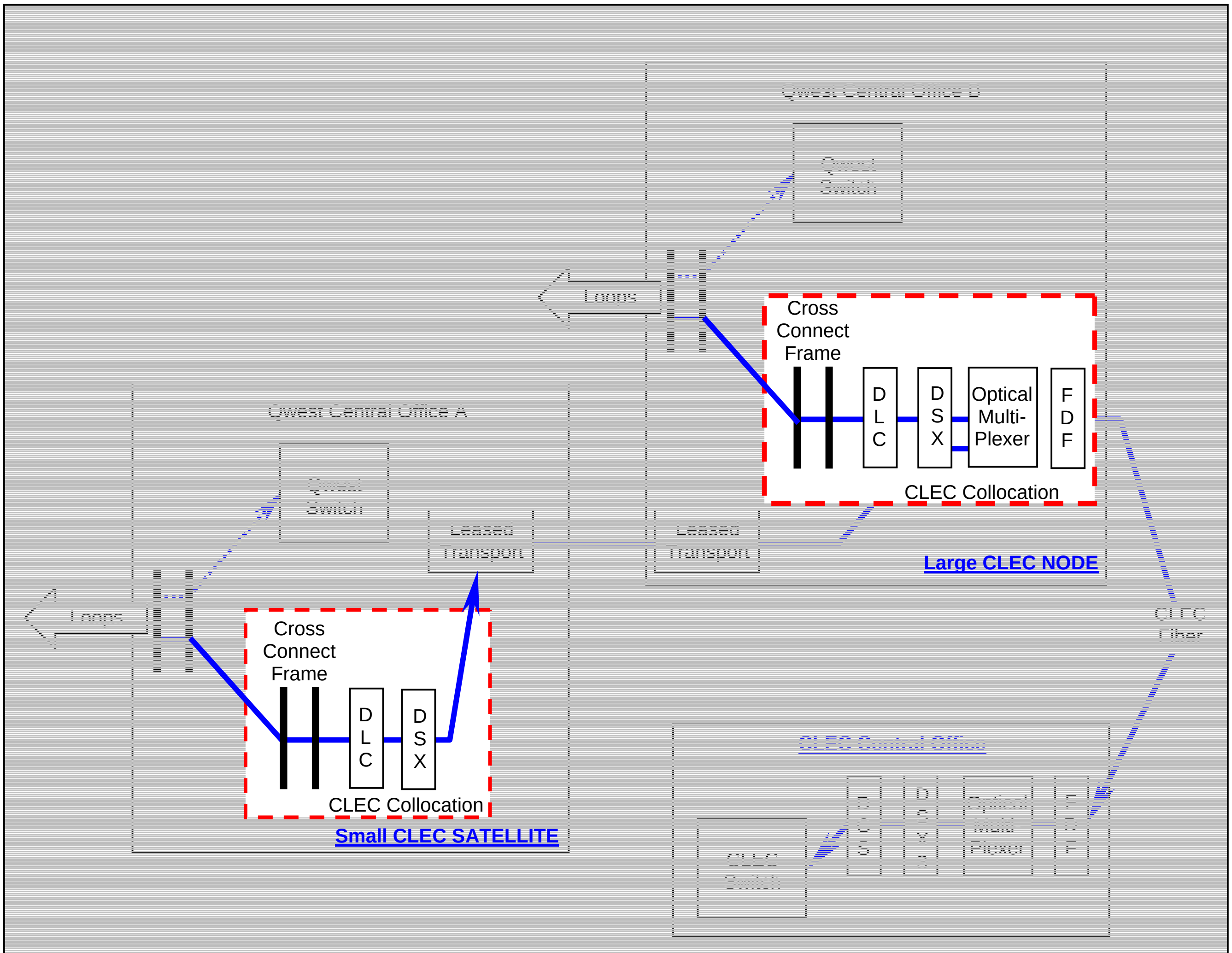

Figure 5 Collocation in the CLEC Network

Q. WHERE AND HOW MUST 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 obtain collocation space from Qwest (outlined in dashed line red box in Figure 5) in the central offices in which it seeks to provide service. The minimum amount of floor space, appropriate for the collocation elements required, is computed for each of the Qwest wire centers in Washington.

Q. GENERALLY, HOW ARE COLLOCATION COSTS DETERMINED?

A. Collocation costs are principally a function of the (a) amount of space required, (b) number of cross-connections, and (c) amount of DC power required to provide the backhaul functionality. Because the number of frames required in a central office is developed in the manner discussed above and because the average floor space required by a frame is known, the minimum amount of collocation space required in any given Qwest 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 a given Qwest central office can be established.

Q. WHAT DATA SOURCES DO THE TOOLS RELY UPON FOR THE COLLOCATION COSTS?

A. The source data for the collocation costs used in the Tools are current collocation rates, by type of collocation, for Qwest as approved by the Washington Commission.[28] The Tools build bottom-up collocation costs for each Qwest central office that would be used to provide service to mass-market customers in Washington including:

- AC and DC power cost;
- Space occupancy;
- Space construction;
- Administrative charges;

[28] WA SGAT Exhibit A, Section 8.

- DS0 connectivity; and
- Fiber entrance facilities.

Q. HOW DO THE TOOLS CALCULATE THE COLLOCATION COSTS FOR EACH QWEST CENTRAL OFFICE IN WASHINGTON?

A. The Tools determine the collocation costs for each central office by applying Washington specific rates to the equipment space, power and cross-connection requirements of the particular central office (calculated as described above). Qwest's collocation charges -- recurring and non-recurring-- are organized on the basis of common cost drivers (*i.e.*, square feet of space, DC amps required, and 2-wire cross-connections), and then multiplied by the driver values for each Qwest central office. If an efficient CLEC is required 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 sufficient to address the equipment deployed in the specific office is determined and used in the cost calculation.

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 cost computation is based on the calculated power consumption of the required equipment and appropriate Qwest rates.[29] The Tools also include the capability to match the projected equipment power requirement to the basis upon which Qwest charges are applied.

[29] WA SGAT, Exhibit A, Section 8.1.4.

Q. HOW DO THE TOOLS DETERMINE THE AMOUNT OF COLLOCATION SPACE NEEDED FOR HOUSING THE CLEC EQUIPMENT?

A. The space occupancy and construction charges reflect the standard sizes established by the WUTC. The collocation section of the Tools employs a set of formulas that calculate the appropriate collocation charges. Once the relevant charges are selected, the Tools use the actual square footage needed at that central office to compute the relevant costs. The Tools calculate the total number of frames deployed (e.g., for DLC, termination equipment, and transport equipment) and multiplies the total frame count by user-adjustable inputs for the floor space footprint required by the frames. The resulting square footage is the minimum amount of collocation space required to serve the anticipated efficient CLEC market share in each Qwest wire center. The Tools effectively calculate the cost of collocation for space requirements running from zero to 300 square feet in 100 square foot increments, matches those to the specific capacity increments in Qwest's SGAT Price List, and selects the minimum cost alternative to provide the amount of space required.

The connectivity charges are computed separately at the individual loop, DS-1 and DS-3 levels (depending on the type of transport employed), and for fiber cable runs when necessary. Qwest charges CLECs to physically cross-connect transport facilities to the equipment in the CLEC's collocation area. If leased transport is employed, the cross-connection is at the DS-1 or DS-3 level. Charges may also be paid by the CLEC for the cost of a cable from the CLEC's collocation to an intermediate cross-connection frame in the central office where Qwest actually makes its cross-connection. Even when self-provided transport is employed, charges may apply to cross-connect fiber cable running from the CLEC facility in the street outside the central office to an intermediate frame within Qwest's space.

In general, Qwest connectivity charges are assessed based on one or more of the following: (1) per termination, (2) per block of terminations or conductors, (3) per cable, or (4) some combination of these three. The Tools determine, based on 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 on the conditions in each office where the CLEC serves its customers.

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 space and administrative costs 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. However, no adjustment is made to DC power consumption. This distinction is made because (1) power charges tend to be significant and (2) power consumption will be proportional to the demand as it is acquired over time. In contrast, other collocation costs are incurred immediately, based upon ultimate capacity, because it is costly to expand cages and augment connectivity.

C. Costs of Connecting UNE-L to the CLEC's Switch.

1. Facility Ring Processor (the "FRP").

Q. PLEASE HIGHLIGHT THE PORTION OF THE CLEC NETWORK DESIGN THAT CORRESPONDS TO THE FRP.

A. Figure 6 below highlights in red, (the line between Boxes B, C and the CLEC Central Office), the CLEC self-provided facility that links the larger Qwest central offices that corresponds with the calculations performed by the FRP.

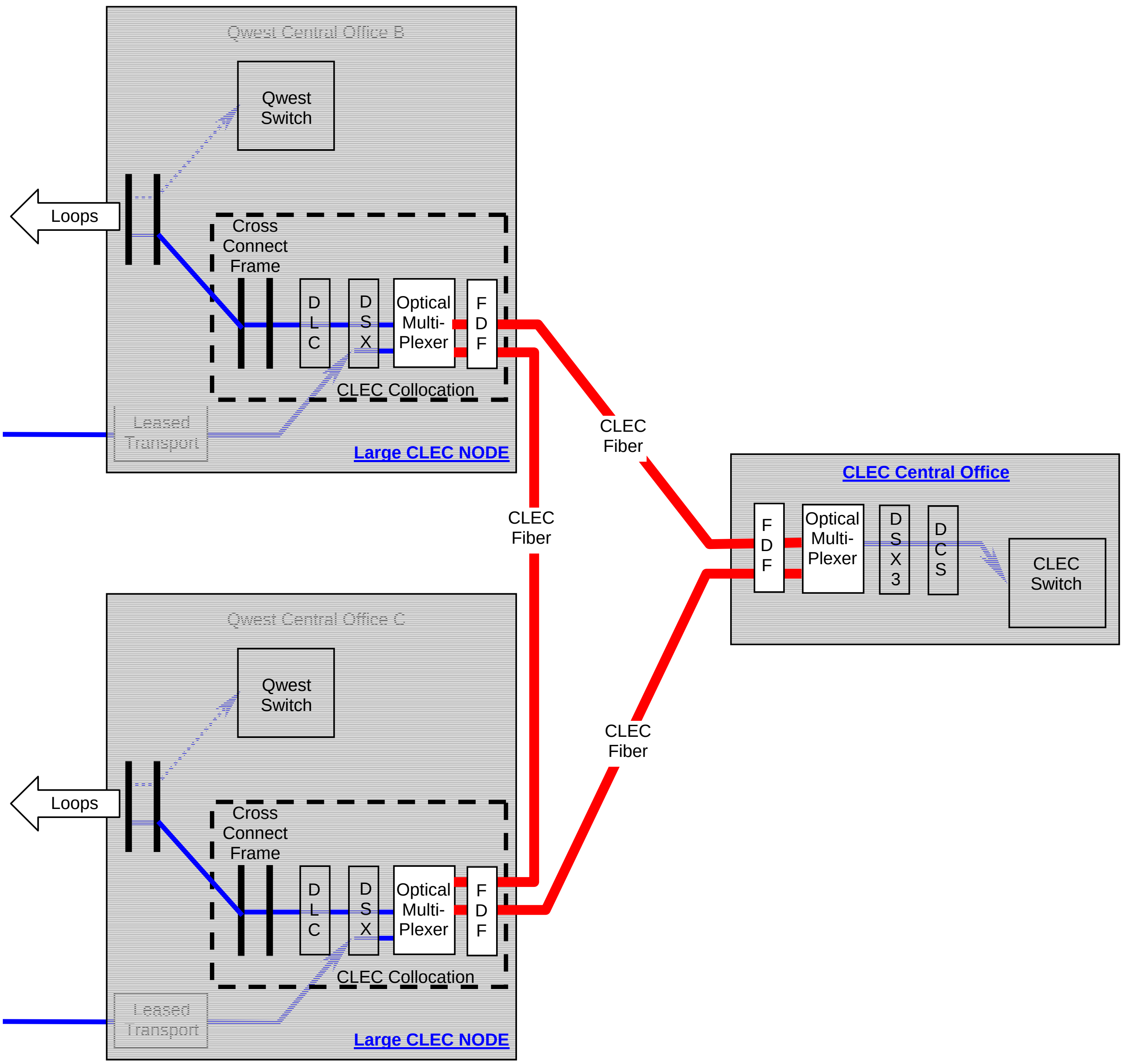

Figure 6 – CLEC Network and the Facility Ring Processor

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Q. HOW DO THE TOOLS CALCULATE THE LEVEL OF COST IMPAIRMENT ASSOCIATED WITH TRANSPORTING A CUSTOMER'S LOOP FROM EACH QWEST CENTRAL OFFICE TO THE CLEC SWITCH?

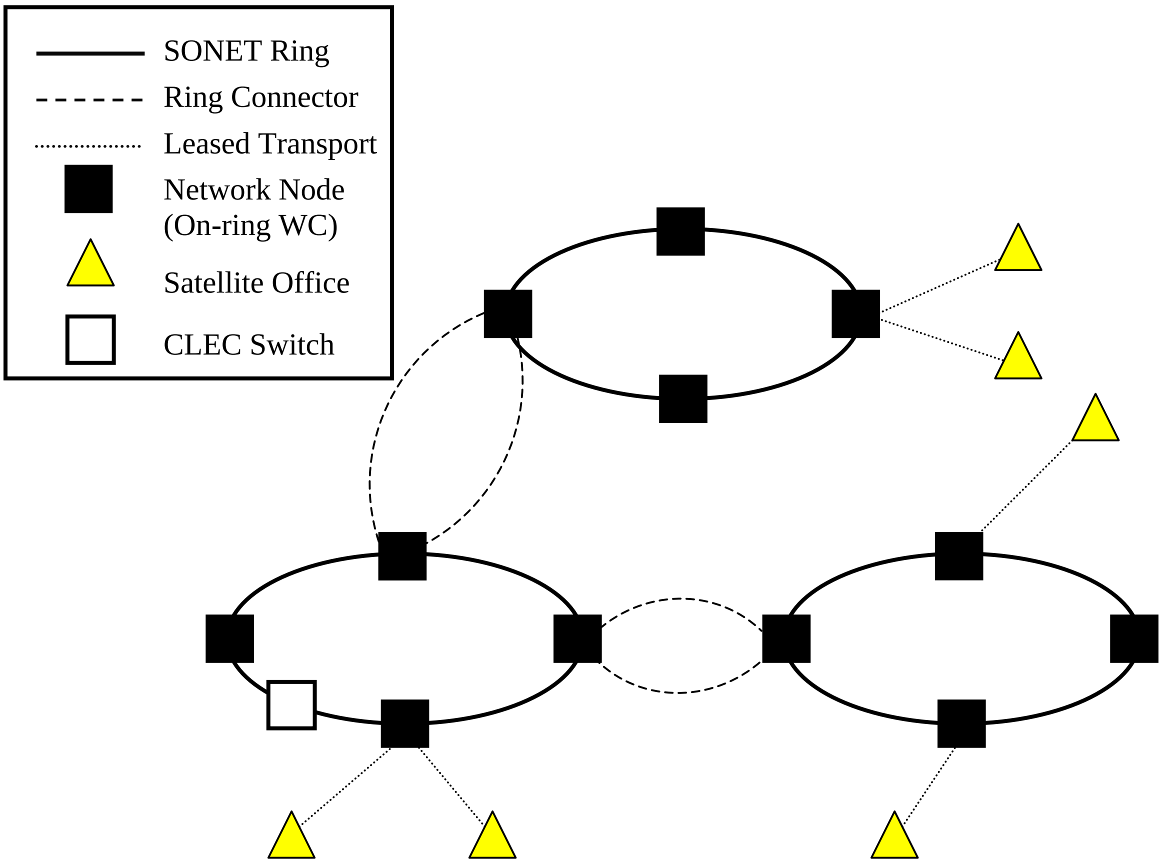
A. The FRP initially establishes a self-provided CLEC facility network that links the larger Qwest central offices. The CLEC collocation at those wire centers form the Network Nodes of the CLEC ring. Each remaining Qwest central office (or "Satellite" office) to be served is then "homed" to the closest Network Node location (locations on rings, *i.e.*, connected by self-provided SONET ring architecture) to establish the airline mileage between the two locations. This process creates the CLEC's basic transport network. The Transport Tool then calculates the cost of constructing a backbone SONET ring, that connects offices designated as Network Nodes, and the cost of leasing special access transport from Qwest to connect Satellite offices to their nearest Network Node.

In sum, the FRP develops a reasonable CLEC network topology based on the locations of existing Qwest central offices and passes information about the CLEC network to the Transport Tool that, in turn, uses this information to estimate the CLEC transport costs.

Q. CAN YOU PROVIDE A MORE GRANULAR VIEW OF THE PORTION OF THE CLEC NETWORK THAT IS DEVELOPED BY THE FRP?

A. Yes. Figure 7 below provides a more granular view of the network topology employed by the FRP.

Figure 7: Facility Ring Network Topology



Preliminarily, attention is directed to the Legend provided with Figure 7 that indicates how all of the piece parts of this network topology have been represented in the diagram.

Generically, the diagram depicts a network topology that could reasonably serve a study area. In this study area there are Network Nodes (black squares) that must be linked together to form SONET rings (black solid lines). The Satellite offices in the study area are linked to the SONET rings using leased transport (broken lines). Rings are then linked to each other via ring connectors (dashed black line). This network topology ensures that every Network Node and Satellite office has a transmission path to the CLEC switch.

A more comprehensive description of the functions performed by the FRP is contained in the Technical Appendix, Exhibit DD-3.

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

A. Using the VH coordinates for the node locations, the FRP calculates all ring and ring connector distance totals and produces the average distance between nodes within the study area. The FRP also determines the number of SONET regenerators required for the rings and ring connectors. Finally, the FRP reports the distribution of ring distance by density zone, which is used by the Transport Tool to compute structure investment (which varies by density zone).

As noted earlier, the FRP also associates each Satellite office location with its nearest Network Node location and reports the associated distances to the Transport Tool. Because this tool assumes that satellite-to-node facilities will be leased from the ILEC (*i.e.*, using special access), the FRP reports these distances in terms of airline mileage. This distance is used subsequently to determine pricing of incumbent supplied connectivity (*i.e.*, interoffice transport) in the calculation of backhaul costs in the DS0 Impairment Analysis Tool workbook.

2. <u>The Transport Impairment Analysis Tool (the "Transport Tool")</u>.

Q. HOW ARE THE FRP AND TRANSPORT TOOL LINKED TO ONE ANOTHER?

A. The FRP reports ring node counts, average ring distance between nodes, regenerator counts, satellite distances, and ring distance by density zone to the Transport Tool, which in turn calculates investment in cable, structure, and transmission equipment for the transport network. The Transport Tool also computes leased facility costs for the satellite locations.

Q. PLEASE HIGHLIGHT THE RELEVANT PORTIONS OF THE CLEC NETWORK THAT CORRESPOND TO THE TRANSPORT TOOL

A. Figure 8 below highlights in red (the equipment in the dashed line box in Central Office A, the facilities between Central Office A, Central Office B and the CLEC Switch Location, plus the equipment in Central Office B), the portions of the CLEC network that correspond to the analysis being performed in the Transport Tool.

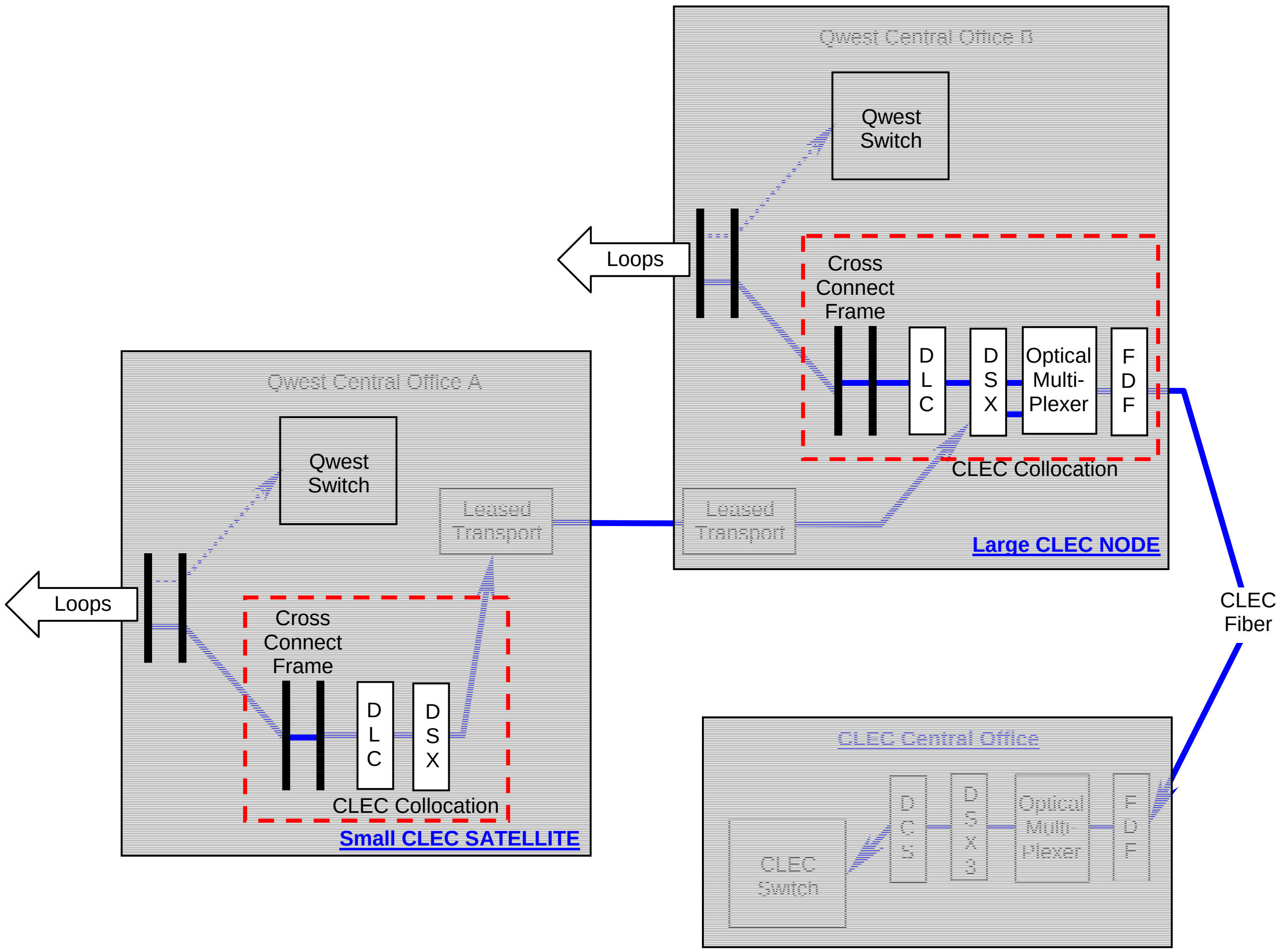


Figure 8 – CLEC Network and the Transport Tool

Q. IS THIS COST CALCULATION CONSERVATIVE IN NATURE?

A. Yes. It is important to understand that this calculation is another of the conservative assumptions made within the Tools. The Tools assume that the SONET rings built between the Network Nodes will be used for more than just the transport of UNE-L traffic. First, the average cost of a DS-1 or DS-3 on the self-provided network is calculated. Then this average cost is attributed to the transport associated with UNE-L traffic terminating at Network Node collocations. The Tools assumes that other DS-1s or DS-3s on the same self-provided network will bear their share of the network's cost from other enterprise applications and are not included in the Tools analysis.

Q. HOW DOES THE TRANSPORT TOOL DEVELOP THE COSTS FOR SATELLITE OFFICES?

A. As I noted earlier, the FRP calculates the airline distance between a Satellite office and the closest Network Node. The Transport Tool then calculates the DS-1 or DS-3 transport cost using the relevant Qwest rates for leased DS-1 and DS-3 facilities. The selection of DS-1 or DS-3 transport is based on the number of unbundled loops that the efficient CLEC expects to serve within a central office and the backhaul capacity requirements (DS-1 or DS-3) of the DLC system selected to serve the demand. Based on the number and type (DS-1 or DS-3) of the facilities required at the satellite location, the transport cost can be calculated. The Tool calculates these costs in this fashion for all satellite locations in the study area. The total transport cost for a satellite location is the combination of the leased facility cost and the cost of the self-provided transport from the Network Node location to the efficient CLEC's switch.

Q. YOU STATED PREVIOUSLY THAT THE ALLOCATION OF COSTS FOR 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, an efficient CLEC, self-provided SONET transport infrastructure would rarely if ever be built only to handle transport traffic generated by mass-market customers. In recognition of this fact, the Transport Tool assumes that there would also be significant enterprise customer traffic moving between Network Node locations on the transport rings 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. Again, this makes the cost disadvantage estimate produced by the Tools very conservative.

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

A. Quite simply, the addition of more Network Nodes to the SONET ring 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 Network Nodes. However, utilization is not a static assumption. If Network Nodes were added to the ring network, the following could occur: (1) the average cost of transport per DS-3 would increase because the overall ring distance would increase; and (2) the expected average utilization of the ring could decrease because one would generally be adding Network Nodes with lower anticipated demand than those nodes already on the rings.

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

Q. THE THIRD MAJOR COMPONENT OF THE COST DISADVANTAGE INVOLVES THE COST FOR TRANSFERRING CUSTOMERS. PLEASE DESCRIBE HOW THESE COSTS ARE CALCULATED.

A. The third major component of an efficient CLECs' economic impairment is the cost associated with transitioning customer loops from Qwest to an efficient CLEC, the "hot cut." The largest component of the hot cut cost consists of the charge(s) that Qwest assesses to transfer each customer's loop from its network facilities to the CLEC's collocation (*i.e.*, the "hot cut" charge), which is a nonrecurring per-line charge imposed on CLECs so they can connect Qwest-supplied loops to CLEC-owned switches. 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 an input to the impairment analysis, weighted average costs per line are developed according to the numbers of single and multi-line mass-market customer locations. Separate calculations are made for consumer and business locations. As the FCC has recognized, charges such as these can "contribute to a significant barrier to entry."[30]

In Washington, Qwest exacts a nonrecurring charge of $59.81. In addition, in Washington, the Commission has ordered CLECs to pay Qwest for the recovery of its OSS development on a per LSR basis. Today that amount is $7.03 per LSR. Both costs have appropriately been added to the hot cut calculations performed by the Tools.

Q. DO HOT CUT COSTS CONSIST ONLY OF THE COST IMPOSED BY QWEST?

A. No. Additional hot cut costs may also include the cost of work that must be performed *internally* by the CLEC in order to complete the transfer.[31] The FCC has recognized not only the economic impairment arising from the hot cut process but also operational issues arising from this internal CLEC activity.[32]

The Tools, therefore, should include an efficient CLEC's internal costs to manage hot cuts in addition to those imposed by Qwest. The average hot cut costs per month are a function of (a) customer churn, (b) the calculated "per-line" hot cut charges, and (c) the internal costs of the efficient CLEC.

[30] TRO at ¶470.
[31] *See*, TRO at 465.
[32] TRO at ¶465

With respect to customer churn, if a customer remained with the efficient CLEC forever, the CLEC would incur only a single hot cut cost for each customer that it serves. Customer behavior in competitive mass-markets, however exhibits significant churn. Thus, the default churn rate employed by the tools is 4.6% per month.[33] For this reason, the calculation of the hot cut charges per customer must be higher to reflect the effects of this churn on total hot cut activity.[34] The Tools account for this by combining the CLEC's net growth in lines with its disconnect rate. Thus, if the CLEC grows its overall number of lines by 5% in a year, and it also anticipates a 5% disconnect rate, its hot cut expenses in that year would be the hot cuts associated with the 5% net line growth *plus* the hot cuts associated with replacing the 5% of lines that would otherwise be lost, *i.e.*, a total of 10% of the lines in that year would experience the costs associated with the hot cut.

V. <u>CLEC COST DISADVANTAGE</u>

Q. TO THE EXTENT POSSIBLE, PLEASE HIGHLIGHT THE NETWORK THAT CORRESPONDS WITH THE CLEC COST DISADVANTAGE.

A. Figure 9 below highlights in red, (the equipment in the dashed line box in Central Office A, the facilities between Central Office A, Central Office B and the CLEC Switch, and the equipment in Central Office B), the network that corresponds with the cost disadvantage a CLEC would incur in provisioning mass-market local service using UNE-L – costs that Qwest does not incur. Obviously, the

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[33] *See* Banc of America Securities, April 30, 2003, page 10.

[34] *See, e.g.*, TRO at 471 ("The evidence in the record demonstrates that customer churn exacerbates the operational and economic barriers to serving mass-market customers.")

costs for hot cuts, including the OSS cost recovery charges, are inherent in, but cannot be pictured in this network architecture schematic.

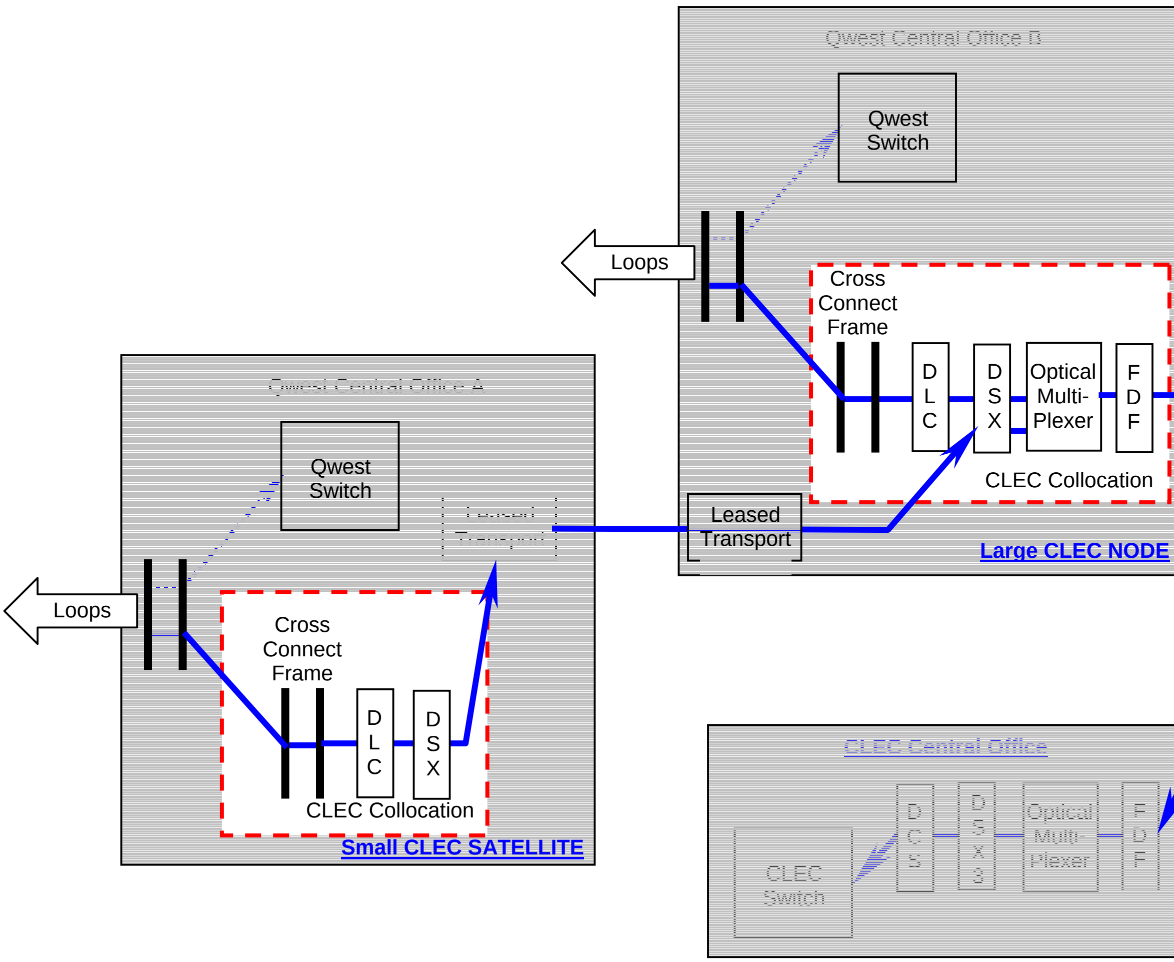

Figure 9 – Compariaon of CLEC Backhaul Network with Qwest Cross Connect

Q PLEASE SUMMARIZE THE CLEC COST DISADVANTAGE FOR WASHINGTON.

A. As indicated in the previous discussion, the Tools rely upon specified inputs for each of the calculations leading to the additional cost disadvantage an efficient CLEC would incur entering the mass-market. Overall, these inputs are conservative because they: (1) 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 an efficient CLEC would spend for customer acquisition.

The results of my analyses, by geographic market, are set forth in Exhibit DD-5 and are summarized in Table 2 below.

Table 2: CLEC Cost Disadvantage per Line per LATA

LATA	CLEC Cost Disadvantage per Line per Month
672	$ 9.22
674	$10.50
676	$15.06

Based upon the calculations performed by the Tools and my analysis, an efficient CLEC that uses self-provided switching and UNE-L would face substantial additional costs as compared to Qwest in each geographic market served by Qwest and it is inescapable that cost disadvantages of this magnitude to the CLEC

– and corresponding cost umbrella for the ILEC – constitute a clear barrier to entry.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.