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Re: Docket No. 980946-TL, 980947-TL, 980948-TL, 981011-TL, 981012-TL, and 981250-TL

Dear Ms. Bayo:

Enclosed for filing on behalf of ACI Corp., AT&T Communications of the Southern States, e.spire Communications, Inc., MCI WorldCom, Inc., Supra Telecommunications & Information Systems, Inc., and Time Warner AxS of Florida, L.P. is an original and fifteen copies of the Rebuttal Testimony of Joseph Gillan in the above referenced dockets.

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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: BellSouth Telecommunications, Inc.'s Petition for temporary waiver of physical collocation requirement set forth in the 1996 Telecommunications Act and the FCC's First Report and Order, for the Daytona Beach Port Orange Central Office	Docket No. 980946-TL
In re: BellSouth Telecommunications, Inc.'s Petition for waiver of physical collocation requirement set forth in the 1996 Telecommunications Act and the FCC's First Report and Order, for the Boca Raton Boca Teeca Central Office	Docket No. 980947-TL
In re: BellSouth Telecommunications, Inc.'s Petition for waiver of physical collocation requirement set forth in the 1996 Telecommunications Act Act and the FCC's First Report and Order, for the Miami Palmetto Central Office	Docket No. 980948-TL
In re: BellSouth Telecommunications, Inc.'s Petition for waiver of physical collocation requirement set forth in the 1996 Telecommunications Act Act and the FCC's First Report and Order, for the West Palm Beach Central Office	Docket No. 981011-TL
In re: BellSouth Telecommunications, Inc.'s Petition for waiver of physical collocation requirement set forth in the 1996 Telecommunications Act Act and the FCC's First Report and Order, for the North Dade Golden Glades Central Office	Docket No. 981012-TL
In re: BellSouth Telecommunications, Inc.'s Petition for waiver of physical collocation requirement set forth in the 1996 Telecommunications Act Act and the FCC's First Report and Order, for the Lake Mary Central Office	Docket No. 981250-TL Dated: May 7, 1999

REBUTTAL TESTIMONY OF JOE GILLAN

ON BEHALF OF ACI CORP., AT&T COMMUNICATIONS OF THE SOUTHERN STATES, E.SPIRE COMMUNICATIONS, INC., MCI WORLDCOM, INC., SUPRA TELECOMMUNICATIONS & INFORMATION SYSTEMS, INC., AND TIME WARNER AxS OF FLORIDA, L.P.

Q: PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Joseph Gillan. My business address is P.O. Box 541038, Orlando, Florida 32854. I am an economist with a consulting practice specializing in telecommunications.

Q. PLEASE BRIEFLY OUTLINE YOUR EDUCATIONAL BACKGROUND AND RELATED EXPERIENCE.

A. I am a graduate of the University of Wyoming where I received B.A. and M.A. degrees in economics. From 1980 to 1985, I was on the staff of the Illinois Commerce Commission where I had responsibility for the policy analysis of issues created by the emergence of competition in regulated markets; in particular the telecommunications industry. While at the Commission, I served on the staff subcommittee for the NARUC Communications Committee and was appointed to the Research Advisory Council overseeing NARUC's research arm, the National Regulatory Research Institute.

In 1985, I left the Commission to join U.S. Switch, a venture firm organized to develop interexchange access networks in partnership with independent local telephone companies. At the end of 1986, I resigned my position of Vice President-Marketing/Strategic Planning to begin a consulting practice. Over the past decade, I have provided testimony before more than 25 state commissions, four state legislatures, the Commerce Committee of the United States Senate, and the Federal/State Joint Board on Separations Reform. I currently serve on the Advisory Council to New Mexico State University's Center for Regulation.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING?

A. I am testifying on behalf of a coalition of six ALECs: ACI Corp., AT&T Communications of the Southern States, e.spire Communications, Inc., MCI WorldCom, Inc., Supra Telecommunications & Information Systems, Inc., and Time Warner AxS of Florida, L.P.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my rebuttal testimony is to respond to BellSouth's fundamental conclusion that the continued denial of critical central office space to its competitors would be an acceptable outcome to this proceeding. While such an outcome may be acceptable to BellSouth -- assuring, as it would, BellSouth's continued monopolization of the customers served by these offices -- BellSouth's position simply reinforces the need for a Commission-ordered solution which will enable entrants to compete. Collocation is not a passive accommodation, but is a threshold obligation that must be satisfied for many forms of entry to occur. To assist the Commission's review of the six central offices at issue here, I recommend that the Commission apply the following three principles:

* *Scarce central office space should be utilize in the most efficient manner possible.* BellSouth should immediately conform its collocation offerings to include the "cageless collocation" arrangement now required under federal rules.
* *Scarce central office space should be devoted to its most productive use.* BellSouth should convert available central office space to house telecommunications equipment, using the most efficient space management policies available. Where necessary, BellSouth should expand available space to

include "adjacent" areas.

* *Current use should be given priority over future use.* It is unreasonable to allow BellSouth to reserve scare space that is today idle and available, while relegating competitors to wait for future space. *Future needs* should be satisfied by *future space* -- whether the future need is that of BellSouth or that of an entrant.

In the testimony which follows, I develop these principles more fully. In addition, for background information, I have attached to my testimony (Exhibit ___ (JG-1)) a white paper prepared by the Competitive Telecommunications Association (CompTel) that addresses collocation in some detail: Uncaging Competition: Reforming Collocation for the 21st Century (September, 1998). Although this white paper was prepared prior to the FCC's recent decision requiring cageless collocation, much of its discussion provides a useful primer on the policy issues involved.

Q. WHY IS COLLOCATION SO CRITICAL TO THE DEVELOPMENT OF LOCAL COMPETITION?

A. There are a number of reasons why collocation is so important to the development of local competition. First, collocation is necessary so that competitive networks may overlay and interconnect with the ubiquitous legacy network of the ILEC. The most familiar use of collocation is its use by a "first-generation" ALEC (i.e., a voice-service provider) to interconnect the ALEC's network to the ILEC's local loops to provide local service. In this way, collocation enables competitive networks to reach a greater number of potential customers (although the cost of manual circuit arrangement

means that not all customers are addressable via this method).

More recently, however, collocation is being used by "second-generation" providers deploying advanced services to business and residential customers. These new services rely on xDSL technology to better exploit the transmission potential of the conventional copper loop to provide high speed data service, sometimes in addition to the customer's voice service on the same facility. In simple lay terms, xDSL technology involves installing matched electronics at both ends of the customer's loop (i.e., at the home/business and at the central office) to be able to derive additional capacity on the facility.

The two characteristics of xDSL technology that are most relevant to this proceeding are that: (1) the technology requires direct access to the terminal end of the copper loop, and (2) the equipment is small, versatile and evolving rapidly.

Q. WHY ARE THESE CHARACTERISTICS PARTICULARLY RELEVANT TO COLLOCATION POLICY?

A. The very nature of xDSL technology means that physical collocation (i.e., the ability to house entrant-supervised equipment within the ILEC central office) is an absolute necessity for competition in a particular market. First, the functional design of xDSL technology means that it must directly connect to the copper loop itself (and, therefore, *must be* collocated in the central office); while the diverse and evolving nature of the equipment means that each entrant must have the ability to *access* its equipment for repair, upgrade and maintenance. These attributes can only be satisfied by physical collocation -- i.e., the collocation option which *both* houses the equipment in the central

office *and* provides the entrant ongoing access to the equipment. (Virtual collocation provides space for the equipment, but denies the entrant ongoing access).

The central issue in this proceeding is identifying precisely what steps BellSouth must take to make physical collocation space available, even in those offices where space may be at a premium. I note that BellSouth apparently concedes that it can accommodate virtual collocation -- that is, BellSouth can find the space for the entrant's *equipment*, but that it will not allow the entrant continuing *access* to the equipment once installed. As a result, the Commission needs to adopt policies which both open more space to collocation and which make ongoing access to that space as efficient, and as nondiscriminatory, as possible.

Q. WHY IS ONGOING ACCESS SO IMPORTANT TO A COMPETITIVE ENTRANT?

A. There are several reasons why ongoing access to collocated equipment is vital to a competitor. If the ALEC cannot access its own equipment, it has to either select the same equipment as the ILEC, or it must train the ILEC's technicians on the equipment that the ALEC selects. Neither of these constraints is reasonable, particularly where technology is advancing as rapidly as xDSL technology. Being limited to the ILEC's technology choice limits innovation. The ALECs' choice in vendors and equipment should not be driven by the ILEC's business plan. Rather, competitors should be free to compete on the basis of deploying the most sophisticated and technologically advanced equipment available to provide the fastest and most advanced services.

Being required to train the ILEC's personnel on the equipment chosen by new entrants is even more problematic. When an ALEC must train (and then rely upon) the ILEC's technicians, it becomes increasingly vulnerable to the actions of its principal rival. ALECs must rely on the ILEC's technicians to repair and maintain the equipment without being able to exert any type of control over these technicians. This dependency limits the entrant's ability to provide service guarantees to its customers (a key competitive differentiation) and it can substantially increase the ALEC's costs. Furthermore, ALECs build enterprise value by increasing their investment, customers and *human capital.* A skilled workforce is an important consideration to an ALEC's attractiveness as a merger candidate or strategic partner. It is absurd for the ALEC to incur the *cost* of building human capital, if the *benefit* of that capital is then controlled by the ILEC (and is thus subject to the ILEC's management, promotion and scheduling decisions).

Q. HOW DO THESE FACTORS RELATE TO COLLOCATION POLICY?

A. The fundamental conclusion of the above discussion is that competition will depend -- and competition for advanced services will *absolutely* depend -- on how aggressively the Commission works to open BellSouth's central offices to physical collocation by entrants. Conversely, BellSouth's market position will be protected -- and its market position for advanced services will be absolutely protected -- by how well BellSouth frustrates entrants from achieving this same objective.

Although the Commission may not welcome a role as "space monitor," there is unfortunately no other alternative. BellSouth's incentive

is to restrict access to its central offices, using whatever "logic" it can muster. (See, for instance, BellSouth's claim (Milner, page 25) that cageless collocation will foster the certification of "terrorist ALECs" intent on crippling the nation's phone system.) Collocation (like other interconnection requirements) are *legal obligations* precisely because BellSouth has so little *commercial incentive* to accommodate competitors. Consequently, it is up to the Commission to find the space in BellSouth's central offices to enable competition to proceed.

Q. WHAT PRINCIPLES AND RULES SHOULD THE COMMISSION APPLY TO DETERMINE HOW TO BEST UTILIZE CENTRAL OFFICE SPACE?

A. First, the Commission should assure that *scarce central office space is utilized in the most efficient manner possible.* As a general proposition, the most efficient approach to collocation is to eliminate, to the maximum extent practical, any wasteful separation between the collocator's equipment and the equipment of the ILEC. The industry term for this form of collocation is "cageless collocation," an arrangement which enables the competitor's equipment to be installed "alongside" the equipment of the ILEC.

Q. DOES THE FCC NOW REQUIRE THAT BELLSOUTH OFFER CAGELESS COLLOCATION?

A. Yes. Recognizing that incumbent LECs do not have an incentive to welcome competitors, FCC rules now require that BellSouth offer, *as a standard arrangement*, a cageless option satisfying the following parameters (CFR § 51.323 (k)(2)):

* Incumbent LECs must allow competitors to collocate in any

unused space in the incumbent LEC's premises, without requiring the construction of a cage or similar structure, and without requiring the creation of a separate entrance to the competitor's collocation space.

* Incumbent LECs must give competitors the option of collocating equipment in any unused space within the incumbent's premises, and may not require competitors to collocate in a room or isolated space separate from the incumbent's own equipment.

* An incumbent LEC must make cageless collocation space available in single-bay increments, meaning that a competing carrier can purchase space in increments small enough to collocate a single rack, or bay, of equipment.

* An incumbent LEC may require collocating carriers to use a central entrance to the incumbent's building, but may not require construction of a new entrance for competitors' use, and once inside the building, incumbent LECs must permit collocating carriers to have direct access to their equipment.

* An incumbent LEC may not require competitors to use an intermediate interconnection arrangement (such as a POT bay) in lieu of direct connection to the incumbent's network if technically feasible.

Q. DO BELLSOUTH'S COLLOCATION OFFERINGS COMPLY WITH THE FCC ORDER?

A. No. Although BellSouth implies that it offers "cageless collocation" (Milner,

page 9), the arrangement it describes is "cageless" in name only. In effect, BellSouth allows CLECs to share a single caged environment created by BellSouth, but these entrants remain separated from BellSouth equipment. The first step that the Commission can take to improve collocation conditions is by requiring that BellSouth introduce a cageless offering conforming to FCC rules.

Furthermore, one of the benefits of a cageless environment is that it should eliminate BellSouth's contention that fire-rated walls are required. Certainly, if *no* walls (of any kind) are needed, then the *type* of wall (fire-rated, or chain-link) cannot be an issue. I also note that BellSouth today "collocates" its equipment in the transmission space of interexchange carriers (where BellSouth installs entrance facilities to provide access service to IXC POPS) and I have never come across either party claiming that a wall (fire-rated or otherwise) is necessary.

Q. IF THERE ARE STILL SPACE CONSTRAINTS, WHAT ADDITIONAL PRINCIPLES SHOULD THE COMMISSION APPLY?

A. The Commission should adopt the policy that *scarce central office space should be devoted to its most productive use.* This means that the Commission should require that BellSouth convert available central office space to house telecommunications equipment, using the most efficient space management policies available. For instance, Staff has indicated that space would be available (Welch, page 3) if BellSouth would move administrative space, or if its claimed need for fire-rated walls were eliminated.

The Commission should never accept, however, BellSouth's alternative principle that collocation space should be given a priority below

any BellSouth use. BellSouth argues that breakrooms and administrative space should be off-limits to collocation, simply because (according to BellSouth, Milner, page 29) "all of these [uses] constitute productive use of floor space." The relevant metric, however, should be whether the use is the *most* productive -- and clearly, the most valuable use of scarce central office space is in the provision of telecommunication services.

Q. SHOULD BELLSOUTH BE ALLOWED TO "RESERVE SPACE" AND THUS DENY IDLE SPACE TO COMPETITIVE ENTRANTS?

A. No. While it may be reasonable to for BellSouth to reserve space for its *immediate* needs, in central offices where space is limited the decision principle should be that *current use is given priority over future use*. As an objective principle, a service today should generally take precedence over a service that will be (or may be) offered in the future. Said differently, consumers should not be *denied* a service today just so it is more *convenient* for BellSouth to offer a service in the future. Space should not be held for a future use if it can be put to productive use today.

Q. HOW WILL BELLSOUTH PROVIDE SERVICE IN THE *FUTURE* IF ENTRANTS USE CENTRAL OFFICE SPACE *TODAY*?

A. It is important to understand that no space shortage should be considered permanent. In those central offices where there is an *existing* constraint on space, then measures will be necessary to create more usable conditioned space. Space maximizing actions could include, for instance, removing obsolete equipment, relocating administrative space, or simply implementing appropriate security measures so that entrants can access what might otherwise be considered "virtual collocation" space (which, with ongoing

access assured, could become "physical collocation.") Indeed, under new federal rules, BellSouth is obligated to create new "adjacent" collocation space in those instances where existing space has been exhausted (CFR § 51.323 (k)(3)):

> An incumbent LEC must make available, where space is legitimately exhausted in a particular incumbent LEC premises, collocation in adjacent controlled environmental vaults or similar structures to the extent technically feasible. The incumbent LEC must permit the new entrant to construct or otherwise procure such an adjacent structure, subject only to reasonable safety and maintenance requirements. The incumbent must provide power and physical collocation services and facilities, subject to the same nondiscrimination requirements as applicable to any other physical collocation arrangement.

As new space becomes available, this new space should be available to meet the future needs of *both* ALECs and BellSouth. After all, the real test of non-discrimination is that BellSouth should be no more "disappointed" by locating its equipment in this new space than would be an entrant. That is, if the space provides the same access to BellSouth's network elements that BellSouth currently enjoys, then BellSouth should not be disadvantaged by placing its future investment in new collocation space.

The deciding principle in space-constrained offices should be that BellSouth's *future* needs should be assigned to *future* collocation space. It makes no sense to require that an entrant with an immediate need must wait until more space is available, while BellSouth reserves idle space that will not be needed until the future. Following this simple policy will both free

existing space to more productive uses, as well as provide BellSouth the incentive to make sure that expanded collocation space is as useful as possible.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.

Uncaging Competition:
Reforming Collocation for the 21st Century

Table of Contents

Attachments

Executive Summary

The purpose of this White Paper is to describe a basic set of collocation reforms that will more efficiently accommodate the needs of a rapidly evolving competitive local industry. The fundamental conclusion of the paper is quite simple. The traditional collocation arrangements currently offered by incumbent local exchange carriers (ILECs) are complex, costly and slow to provision. What is more, these traditional methods are particularly ill-suited to the needs of a new generation of competitive entrants interested in offering advanced data services to a broad market of potential customers.

CompTel encourages policy makers to reevaluate the reasonableness and effectiveness of traditional collocation methods. The basic template for collocation is now nearly ten years old. Many common perceptions concerning collocation -- for instance, the *presumption* that physical collocation space should be caged -- can be traced to experimental efforts to open the local market to competition. The entire premise of local competition was new at that time as entrants were fighting for the basic right to compete, and the economic harm caused by unnecessary ILEC conditions could be absorbed more easily when competition was limited to the high margin private line/special access market. The ability to collocate *at all* was the preeminent objective -- and if acceding to a "cage" was necessary to accomplish this goal, then the concession was made.

In the time since collocation was initially debated, however, technology has changed, the market has changed, and the needs of competitors have changed -- but the ILECs continue to adhere to a caged-based view of collocation that increases costs, wastes space and imposes unnecessary delay. Demanding that each entrant be isolated in its own cage severely and adversely constrains collocation-based entrants from offering competitive alternatives to the

ILECs' services. Consequences include:

* Significant delays associated with the complex ordering, construction and provisioning processes of the ILECs.

* Excessive costs caused by unnecessary conditioning activities and wasteful space requirements.

* Limited availability due to claims of space exhaustion at critical central offices.

CompTel's fundamental conclusion is that the traditional view of collocation -- a dedicated cage equaling 100 square feet -- is unnecessarily costly and inflexible, particularly when compared to the collocation profile of new technologies. Continual advances in microelectronic circuitry translate to the need to collocate equipment of decreasing dimension and increasing functionality. xDSL technology alone promises a new wave of entry to the local market. Further, as competition expands beyond urban markets to areas with smaller central offices and lower density, there will be a corresponding need for more efficient and less costly collocation options. Traditional collocation rules which isolate competitive local exchange carriers (CLECs) in dedicated caged space or which limit the types and uses of collocated equipment are inconsistent with these fundamental trends.

Fortunately, an environment of simple, reliable and inexpensive collocation options can be a reality. Lessons from a number of *competitive* markets -- the long distance market, the Internet, and the consensus practices of CLECs themselves -- all provide working models of efficient collocation arrangements. The common denominator of these competitive arrangements is cageless collocation, a method favored for its speed, efficiency and cost. The reason is simple. Uncaged collocation space can accommodate far more collocation customers than a caged environment. Since a competitive firm *wants* to attract collocation customers, it views the

efficient utilization of its space as an important objective.

Importantly, the security concern used by ILECs to justify the requirement that each entrant be caged from one another is just as real in these competitive applications. For instance, it is estimated that more than 60 percent of all *worldwide* Internet traffic (including 85 percent of all intra-European traffic and roughly 40 percent of US domestic traffic) transits a single Internet access point known as MAE East. Nevertheless, within this interconnection point resides the equipment of multiple providers and *none* is protected by its own caged enclosure. The difference is not with the *concern* for security, the difference lies in defining what security measures are *reasonable*.

The prevailing ILEC policy to require caged collocation is nothing more than an ILEC convention, born at a time when potential collocators were first entering the market and had few legal rights. Nothing in the Telecommunications Act of 1996 requires (or even suggests) that the new entrant's right to physical collocation should be constrained to a caged environment. Therefore, the single most important reform of ILEC central office collocation practices would be the elimination of the mandatory cage.

CompTel recommends that regulators consider two basic forms of cageless collocation. In the first form -- Shared Space Collocation -- the ILEC would establish a single area for the collocation of competitors' equipment. This area would be physically separated from the ILEC's equipment, but *within* the shared area, there would be no cages separating one collocator's equipment from another's. In the second form -- Common Space Collocation -- new entrants would be allowed to collocate their equipment within the *same* conditioned space as the ILEC, separated by only whatever delineation (such as a separate aisle) needed to establish a clear demarcation between the ILEC's and CLEC's equipment.

Under either of these alternatives, reasonable security measures -- that is, security measures comparable to those found in competitive arrangements -- can be easily accommodated. Competitive collocation arrangements approach security with a large measure of common-sense. The most prevalent form of security is the use of locking equipment cabinets, augmented by the most basic security measure, proper labeling. Additional security is provided by card-access that tracks when technicians have had access to the common space or, in some instances, access escorted by an ILEC employee.

Finally, CompTel proposes a variety of reforms to traditional physical (i.e., caged) and virtual collocation. Our goal is to ensure that the collocation offerings of the ILECs are as efficient and as flexible as possible, thereby fostering the competitive local market so central to the nation's telecommunications policy. CompTel recognizes, however, that no single policy or entry strategy can be expected to achieve a competitive local market by itself. While the reforms proposed herein should greatly increase the productive value of collocation to competitive entrants (and, therefore, consumers), we also recognize that significant barriers to local competition will remain. Nevertheless, reforming collocation is an important step in the process of opening the local market to competition.

Amid the details of CompTel's analysis, however, is a broader message and more fundamental conclusion. The purpose of collocation is to foster a competitive environment for the benefit of consumers. Regulators should be concerned with the speed, efficiency and utility of collocation because it will determine the choices and prices paid by consumers. The time is now to reform collocation and come one step closer to the competitive vision embraced by Congress when it passed the Telecommunications Act of 1996.

I. Introduction

One factor important to the development of alternative local networks is ensuring that competitors can efficiently collocate facilities in the central office environment of the ILEC. Traditional "first-generation" efforts addressing collocation, however, have resulted in an unnecessarily expensive, caged collocation environment that is ill-suited to the needs of a new generation of competitive entrants.

The purpose of this White Paper is to describe the "next generation" of collocation offerings that will be necessary to accommodate the broader needs of the rapidly evolving competitive local industry. The fundamental conclusion of the paper is quite simple. Traditional collocation arrangements currently offered by ILECs are complex, costly and slow to provision primarily because of the ILECs' insistence on isolating each entrant to its own dedicated and caged environment.

Fortunately, simple, reliable and inexpensive collocation options can be a reality. Lessons from a number of *competitive* markets -- the long distance market, the Internet, and the consensus practices of CLECs themselves -- all provide working models of efficient collocation arrangements. The common denominator of these competitive arrangements is cageless collocation, a method favored for its speed, efficiency and cost. The competitive experience provides a valuable template that can be used to fundamentally reform ILEC collocation offerings in a manner that will promote local competition and the deployment of advanced technologies.[1]

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[1] This paper focuses on improving collocation opportunities *within* the central office environment. Notably, new technologies and network demands are creating an increasing need to collocate at other points (for instance, at a remote terminal). The issues raised by non-central office collocation, however, are beyond the scope of this paper and will not be addressed here.

Dockets: 980946, 980947, 980948, 981011, 981012, 98125
Witness: J. Gillam
Exhibit _____ (JG-1) Page 6 of 48 page

This paper will discuss the important role that collocation plays in the expansion of competitive networks and describe how collocation has been implemented thus far.[2] The paper describes the two basic collocation arrangements currently offered by the ILECs (i.e., physical and virtual collocation) and explores how various ILEC policies limit the usefulness of these arrangements. The paper then compares these traditional collocation arrangements to the collocation products offered by competitive carriers. These competitive offerings provide a useful benchmark in terms of cost, flexibility and efficiency to judge the reasonableness of ILEC practices.

The final section of the paper describes a number of reforms intended to sharply reduce collocation costs, to make provisioning intervals shorter, and to use scarce central office space more efficiently. These reforms fall within two categories. First, we recommend that the ILECs embrace "cageless collocation" as a standard physical collocation arrangement. This is the most critical reform required to bring ILEC collocation policies closer to their competitive counterparts. In addition, we suggest a variety of reforms to traditional physical (i.e., caged) and virtual collocation. Our goal is to assure that the collocation offerings of the ILECs are as efficient and as flexible as possible to ensure the competitive local market so central to the nation's telecommunications policy.[3]

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[2] Collocation is necessary for carriers deploying facilities to interconnect with ILEC networks, or to access network elements that will be combined with a CLEC's facilities. Collocation, however, is neither necessary nor appropriate to combine network elements with other network elements obtained from the ILEC. Readers interested in access arrangements appropriate to combining the loop and local switching network elements should request CompTel's White Paper on this topic *Broadening the Base: Combining Network Elements to Achieve Widespread Local Competition*, July 1998.

[3] An early caveat is appropriate. Although collocation is an important tool, no single policy or entry strategy can be expected to achieve a competitive local market by itself. Consequently, while the reforms we propose should greatly increase the productive value of collocation to competitive

II. The Genesis of Traditional Collocation

A. Background

In 1987, consultant Peter Huber posited a world dominated by a "geodesic network" of interconnected and competing providers.[4] Although premature with its conclusions, Mr. Huber's analysis was one of the first to articulate the inevitable transformation of the Bell System's pyramidal architecture towards a "network of networks":

> The old network had a simple Euclidean structure, with an inside and an outside, and clear divisions between them. The new network is described by the mathematics of fractals, with nodes leading into lines, which lead into more nodes, the pattern replicating itself indefinitely down to the smallest scales. The old network made each link in the edifice utterly dependent for support on one link above and one below. Today's smart switches and terminals can hand off and receive traffic and information from all sides. The old pyramid, with all its mass in the center, is being transformed into a geodesic dome, with a profusion of nodes and links unknown in the older architecture, connected around the out side.[5]

The necessary preconditions to achieving a geodesic vision, however, did not exist in 1987 and do not yet exist today. Actually realizing the complex interconnected network predicted by Mr. Huber requires that entrants be positioned to deploy a distributed network,

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entrants, we also recognize that significant barriers to widespread local competition will remain. Achieving a competitive local market is the proverbial journey of a thousand steps and reforming collocation is but one.

[4] See The Geodesic Network: 1987 Report on Competition in the Telephone Industry, Prepared by Peter W. Huber, Consultant to the United States Department of Justice (Jan. 1987).

[5] Id. at 1.6.

overlaying and interconnected to the incumbent's network at any technically feasible point.

Without question, the real estate most important to the development of a distributed network is the conditioned central office space of the ILEC.[6] It is here that the vast network of local loops are concentrated for interconnection with switches and interoffice facilities. Because of its nodal role, the central office provides a unique environment to access network elements, as well as to deploy new technologies which enhance the capability of the elements themselves.[7] Underscoring the importance of the ILEC's wire centers/central offices is the fact that these locations are treated as one of the few (if not only) fixed assets in forward-looking cost models.[8]

It is well recognized that the benefits of competition to *consumers* is directly tied to the ease and efficiency by which *entrants* can configure their networks, access their customers and provide their services. The ability to locate within the ILEC's central office is critical to bringing consumers greater choices and lower prices. Because of the unique role played by the ILEC's central office, access to this space became an early priority of those state commissions that first opened the local network to competition. The New York Public Service Commission established the basic parameters of collocation with its precedential efforts to open the private line market

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[6] The term "conditioned central office space" refers to space that is environmentally prepared (with appropriate electrical, air conditioning and fire protection) to house telecommunications equipment.

[7] The most visible of these technologies is the Digital Subscriber Line Access Multiplexer (DSLAM), a device capable of providing high-speed data services in addition to a customer's traditional voice service over an analog copper loop.

[8] The "fixed wire center" assumption lies at the heart of the HAI cost model favored by competitive entrants, as well as the INDETEC BCPM model supported by ILECs. The fixed wire-center assumption has been widely adopted by state commissions establishing network element prices and is critical to determining potential universal service support at both the federal and state levels.

to competition.[9] The pioneering work of this (and other) state commissions laid the foundation for subsequent federal rules,[10] and ultimately the Telecommunications Act of 1996 (1996 Act).

It is important to appreciate that the basic template for collocation is ten years old. Many common perceptions concerning collocation -- for instance, the *presumption* that physical collocation space should be caged -- are a product of the initial (and inherently experimental) efforts to promote local competition. Significantly, these inaugural efforts at collocation occurred in a far different environment than today. The entire premise of local competition was new, requesting carriers were fighting for their basic rights to compete, and the economic consequence caused by unnecessary ILEC conditions were more easily absorbed in a market of much higher retail prices, especially for the special access and private line services then opening to competition. The ability to collocate *at all* was the preeminent objective -- and if acceding to a "cage" was necessary to accomplish this goal, then in those early days such a trade-off was reasonable. As a result, ILEC policies (such as the cage) were accepted without critical examination by entrants thankful for any opportunity to compete.

In the time since collocation was initially debated, however, technology has changed, the market has changed, and the needs of competitors have changed -- but the ILECs continue to adhere to a caged-based view of collocation that increases costs, wastes space and imposes unnecessary delays. The mere fact that most ILEC collocation offerings *currently* require cages

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[9] See Regulatory Response to Competition, Opinion No. 89-12, Case at 21-32 (NY PSC May 16, 1989) (ordering private line interconnection); Ordering Regarding OTIS II Compliance Filing, Cases 29469 and 88-C-004 (NY PSC May 8, 1991) (approving physical collocation tariff for private line interconnection).

[10] For instance, note the progression of orders by the Federal Communications Commission in CC Docket No. 91-141, Expanded Interconnection with Local Telephone Company Facilities.

is no justification for *continuing* the practice in the future. Before addressing alternatives, however, it is useful to establish a baseline understanding of the common forms of collocation offered today.

B. The Standard: Physical Collocation

There are two basic forms of collocation: physical collocation and virtual collocation. Because these terms frequently are used imprecisely, it is appropriate to begin with a clear understanding of how the terms are used here. The basic distinction between physical and virtual collocation is *ownership*. With physical collocation, the entrant owns the equipment whereas with virtual collocation, the entrant leases its equipment to the ILEC. In either event, the equipment is located within the office itself (albeit in different areas and under different conditions).[11]

Physical collocation requires the lease of space in the ILEC's premise.[12] In its present form, physical collocation space is typically an area segregated from the ILEC's equipment and is generally located in a common area accessible to all CLECs. Within this common area, each CLEC's dedicated space is then isolated from other CLECs by a chain-link fence, more

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[11] In a sense, the term "physical collocation" is redundant. Because the purpose of collocation is to locate network equipment within the ILEC's conditioned central office space, a successful collocation *requires* a physical occupation.

[12] The FCC defines premises "broadly to include LEC central offices, serving wire centers and tandem offices, as well as all buildings or similar structures owned or leased by the incumbent LEC that house LEC facilities. We also treat as incumbent LEC premises any structures that house LEC network facilities on public rights-of-way, such as vaults containing loop concentrators or similar structures." Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, First Report and Order, 11 FCC Rcd 15499 , para. 573 (1996) ("Local Interconnection Order").

commonly called a "cage."[13] The CLEC, using a vendor approved by the ILEC, installs its equipment within its enclosed space and has subsequent access to the equipment for all maintenance and repair activities that are required.

The basic parameters of the typical physical collocation arrangement offered by an ILEC:

Space Allocation:[14] ILECs generally offer space on a first come, first served basis.[15] If a collocated CLEC wishes to expand its existing space, it is only allowed access to contiguous space if such space is available. No carrier (ILEC or CLEC) is permitted to warehouse collocation space.[16] ILECs are not required to expand existing facilities to accommodate requests for physical collocation when existing space is exhausted.[17] ILECs are not permitted to set a maximum space limitation on a CLEC unless the ILEC can demonstrate that such a limitation is necessary due to space constraints.

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[13] BellSouth demands a more costly approach by requiring that the space be enclosed with gypsum wallboard.

[14] See Local Interconnection Order, paras. 585-86 (setting guidelines for space allocation).

[15] A CLEC's priority in the collocation "queue" is determined by the receipt date of the collocation application and the payment of appropriate application and/or engineering fees.

[16] To the extent that an ILEC reserves space, it has the effect of limiting the space available to satisfy collocation requests by CLECs.

[17] In these instances, the only current alternative to a physical collocation arrangement is a virtual collocation arrangement (the topic of virtual collocation will be addressed in the next section of this paper). As explained in the last section of this paper, however, there are ways to "expand" available collocation space by moving administrative offices or reclaiming central office space by retiring obsolete equipment. See Section IV.

Use of Collocated Space: CLECs are entitled to collocate equipment used for interconnection and/or access to unbundled network elements. Traditional examples of the types of equipment CLECs would install to perform these functions include transmission equipment, digital loop carrier systems, remote switching units,[18] and testing and monitoring equipment. Equipment must be for the provision of telecommunications service.[19] Equipment installed by the CLEC must comply with the BellCore Network Equipment Building Systems (NEBS) General Equipment Requirements.[20] The equipment is purchased by the CLEC and installed in the enclosed collocated space by a vendor certified by the ILEC. The CLEC is responsible for the design, engineering, monitoring, testing, performance, maintenance and repair of the equipment installed in the collocated space. Most ILECs currently prohibit the CLEC from subleasing or sharing its collocated space with another CLEC for the installation of the second CLEC's equipment.

Interconnecting Collocated Equipment with CLEC's Network Facilities: The CLEC may choose to use its own (or facilities purchased from a third party) entrance facilities, or it can lease dedicated transport facilities to connect its collocated equipment with its own network components. When the CLEC provides its own entrance facilities, the ILEC will designate a point of interconnection, usually located in an entrance manhole or cable vault. The CLEC is

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[18] The FCC did not impose a general requirement that switching equipment be eligible for collocation (Local Interconnection Order, para. 581). As a result, CLECs have had to arbitrate the right to locate remote switching units in each state.

[19] Equipment used exclusively to provide enhanced or information services is generally not permitted. Local Interconnection Order, para. 581.

[20] NEBS requirements typically address electrical, fire and environmental parameters. Some NEBS requirements, however, impose "quality of service" standards, such as acceptable levels of expected outage. Although an ILEC may legitimately be interested in the former, the latter category (i.e., quality measures) should be solely within the discretion of the CLEC.

responsible for installing entrance cables to this point with sufficient length to allow the ILEC to extend the cable from the point of interconnection to the collocated equipment.[21]

Demarcation Point: A common point of termination (POT) frame is generally installed in the collocation common area. This frame serves as a demarcation point where the network of the ILEC and the network of the CLEC meet. Each party is responsible for maintenance and trouble-shooting the equipment on its respective side of the demarcation point.[22]

CLEC Interconnection within a Collocated Area: FCC rules permit two or more collocators to interconnect their networks at the ILEC's premises.[23] This form of cage-to-cage interconnection is accomplished by extending cables from the cage of the first CLEC to the cage of the second CLEC. These cables are terminated at the appropriate transmission equipment to make for an efficient and cost effective means of establishing an interconnection arrangement between the CLECs.

Access to the Collocated Equipment and Security: Generally the CLEC's employees or authorized agents have access to the collocated equipment twenty-four (24) hours a day, seven (7) days a week. Where possible, this access is provided through a secure entrance available to

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[21] Many ILECs will allow dual entrance facilities in locations where such capacity exists. The "dual entrance" strategy affords the CLEC greater protection by providing two separate routes for the CLEC's entrance facilities.

[22] It is also noteworthy that the POT frame itself is entirely redundant, wastes space, increases cost and introduces an unnecessary point of potential failure. A more efficient configuration would simply extend cables from the ILEC's distribution frame directly to the CLEC's cage without this intermediary point.

[23] Local Interconnection Order para. 594.

CLEC employees displaying the proper identification badge or having security entrance cards issued by the ILEC. In those locations where a secure entrance is not available, an ILEC may require the CLEC's employees and agents to be accompanied by a security escort at the CLEC's expense. Buildings that are not normally staffed may require the dispatch of an ILEC employee or security escort so that the CLEC may gain access to its equipment installed in these locations.

ILEC Charges: ILEC rates for physical collocation typically vary state-by-state, and often building-by-building. Wholly aside from rate levels, ILEC collocation pricing is complex, with multiple charges and rate elements. The following table portrays the types of physical collocation charges that an ILEC will typically impose:[24]

[24] In addition to these charges by the ILEC, the CLEC also incurs its own internal costs purchasing, installing, maintaining and repairing its collocated equipment.

Table 1: Typical ILEC Charges for Physical Collocation

Non-Recurring Charges	Monthly Recurring Charges
Application	Lease of Floor Space (per square foot)
Space Preparation[25]	Power (per amp)
Cable Support Structure	Cable Support Structure
Space Enclosure Construction	Cross-connections
Cable Installation	POT Bay Connections
Security Escort (when necessary)	Entrance Fiber Termination[27]
Cross-connections	
Fiber Placement[26]	

C. The Alternative: Virtual Collocation

Virtual collocation is an attempt to achieve the same economic outcome -- i.e., the same service choices and business opportunities -- as physical collocation, without the CLEC having to first establish secure dedicated space within the ILEC's central office. Virtual collocation is

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[25] This fee is usually developed by the ILECs on an building-by-building individual case basis.

[26] This fee is assessed for extending the CLEC's facilities from the point of interconnection to the riser cables. Fees include charges for all splice work required to make these connections.

[27] This charge is for the riser cable and associated frame terminations.

generally used in those ILEC central offices that cannot support a physical collocation arrangement, or in cases where the CLEC only wishes to install a small quantity of equipment and does not want to lease the minimum footprint required with a physical collocation arrangement. Originally posited as an *alternative* to physical collocation where space was unavailable, the option is sometimes *preferred* because of the space-hungry needs of conventional (i.e., caged) physical collocation. In many instances, caged collocation space is simply unnecessary, and because so few options exist today -- a condition this paper hopes to correct -- virtual collocation plays an important role.

With virtual collocation, the CLEC is able to install equipment in the ILEC's central office without having to lease dedicated space. Instead, the CLEC leases its equipment to the ILEC for a nominal fee (usually $1) and an ILEC-approved vendor installs the equipment on the ILEC's premises.[28] The equipment is commonly installed in an area where it is intermingled with the ILEC's equipment. Performance monitoring and alarming of the collocated equipment -- functions which are typically performed remotely -- generally remain the responsibility of the CLEC. ILEC technicians, however, perform all maintenance and repair work on the CLEC's equipment at the CLEC's direction.[29]

ILEC Charges: Like standard physical collocation, ILEC charges for virtual collocation are varied and complex. The following table outlines typical charges that are imposed with virtual collocation:[30]

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[28] In some instances, ILEC technicians must be used to install virtually collocated equipment.

[29] Generally, the CLEC is denied direct access to its equipment until such time as the CLEC wishes to remove or retire the equipment.

[30] These costs do not include the CLEC's equipment costs or its internal costs for monitoring the collocated equipment and directing the maintenance activities of the ILEC.

Table 2: Typical ILEC Charges for a Virtual Collocation Arrangement

Non-recurring Charges	Recurring Charges	Per Occurrence Charges
Application	Entrance Fiber Termination[34]	Rearrangement Charges
Planning, Engineering and Installation Fees[31]	Cable Support Structure	Training[37]
Interconnection[32]	Power (per amp)	Maintenance
Fiber Placement[33]	Equipment Support[35]	Miscellaneous Labor[38]
	Cross-connections	
	Storage[36]	

[31] These fees are typically equipment specific and based on the types and quantities of equipment being installed.

[32] Charges for engineering, furnishing and installing the cables between the collocated equipment and the ILEC's distribution frames.

[33] Charges for extending CLEC facilities from the point of interconnection to the riser cables. Fees include charges for all splice work required to make these connections.

[34] Recurring rate for the riser cable and associated frame terminations.

[35] Rate includes charges for rack space, environmental support, central office alarms, etc.

[36] Charge for the storage of CLEC provided test equipment, tools and spare components such as plug-ins.

[37] Charges to train ILEC technicians to maintain the CLEC's equipment. Charges include training fees, materials, travel costs (airfare, lodging, surface transportation, meals) and technicians' work time.

[38] Charges for work that is not part of routine or emergency maintenance of collocated equipment. An example of an additional labor cost is the security escort that would be required if the CLEC wished to visit its collocation site.

D. The Competitive Limitations of Traditional Collocation

Initial efforts to define competitively useful collocation arrangements have produced mixed results. Although existing practices accommodated a first wave of entry in several markets, significant problems remain. Moreover, "first-generation" collocation offerings do not consider the more varied collocation needs of new technologies that support advanced data services. Of course, these problems should not be surprising. As noted at the beginning of this section, the basic approach to traditional collocation is nearly ten years old and was developed as a "theory" which predated any practical experience with local competition.

As explained below, the principal source of many of the practical problems with traditional collocation is the requirement that each collocator be isolated in its own unique caged environment. The consequences of this single requirement affect nearly every dimension of collocation: availability, cost and provisioning. In the current environment, the only means to avoid the cage -- virtual collocation -- requires that the CLEC surrender important access to its equipment.[39] By tying the CLEC's access to its acceptance of a caged environment, however, competitive opportunities are lost and new technologies frustrated.

The principal concerns with existing collocation arrangements (both virtual and physical) fall into the following categories:

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[39] As explained in the final section of this paper, there is no reason for such a penalty to exist. Alternatives *can be* implemented which allow entrants more efficient access to central office space without the need for dedicated, caged space.

Delay: As illustrated in Attachment A, establishing a collocation arrangement with the typical ILEC is a laborious, multi-step process.[40] Each of the steps listed in Attachment A has a specific interval which, when added together, create an overall interval of between 75-180 days before a physical collocation space is available for equipment installation.[41] Virtual collocation does not materially reduce these intervals. For instance, Bell Atlantic's internal objective in New York is to complete a virtual collocation arrangement within 105 business days.[42] Further, before the cage is operational, the CLEC's vendor must install the equipment in the collocated space and have the installation tested and accepted for service introduction.[43]

Cost: The cost of collocation is a serious problem. Although a portion of the cost problem can be traced to the *level* of the multiple charges specified above, a large part of the problem is simply caused by *unnecessary* costs created by ILEC policies. These include: (a) the requirement that each collocation enclosure be a minimum of 100 square feet; (b) the requirement that each space be caged; (c) restrictions on subleasing and sharing space; and (d) the need for security escorts, etc. Also, if a CLEC wishes to collocate in a central office where there has never been a collocation arrangement, that CLEC usually bears the full cost to prepare the area.

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[40] Bell Atlantic itself admits that "the process for establishing a physical collocation cage is complex and time consuming, involving a number of different disciplines." Affidavit of Karen Maguire, New York Public Service Commission Case No. 97-C-0271, November 3, 1997.

[41] The specific interval is heavily dependent on the particular ILEC and circumstances.

[42] Affidavit of Karen Maguire, New York PSC Case No. 97-C-0271, November 3, 1997.

[43] Some ILECs have increased even these intervals by imposing other time-consuming, qualifying steps such as obtaining state certification or negotiating a complete interconnection agreement before the ILEC will begin the application process.

With virtual collocation, the CLEC saves the non-recurring cost of establishing the collocation cage, the non-recurring cost of the site preparation (if physical collocation site preparation was required) and the recurring cost of the floor space. However, these costs are replaced with other costs that the CLEC must incur when using a virtual collocation arrangement. The costs unique to virtual collocation include: (a) the recurring cost for equipment support and storage; (b) the non-recurring costs for training (if necessary); (c) equipment service; and (d) additional labor.[44]

Space Availability: Many central offices are at or near exhaustion of available space for collocation due principally to ILEC requirements (i.e. cages) which waste this important space. Often, a CLEC remains unaware of this lack of space until the ILEC responds to the CLEC's collocation application, adding further delay to its entry. To date, most collocation arrangements have been confined to urban central offices. As CLECs begin to expand their footprint into suburban and rural areas, the space availability issue will become significantly worse, especially considering that these secondary areas are typically served by smaller central office buildings. Though virtual collocation is frequently cited by the ILECs as the solution when "physical" space is unavailable, it is unknown whether there will even be "virtual" space in all the ILEC premises where a CLEC wishes to collocate.[45]

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[44] This listing does not take into consideration the costs associated with virtual collocation's principal disadvantage: the CLEC must surrender access to its own equipment to the ILEC. This action increases the cost of routine maintenance and could adversely affect the service quality provided by the CLEC to its customers.

[45] For instance, BellSouth plainly states that "[b]oth Virtual and Physical Collocation are made available on a first come, first served basis (depending on space availability), for interconnection to unbundled network elements, local interconnection trunking, access services and state tariff services as necessary for use by telecommunications service providers." Reply Affidavit of Pamela A. Tipton, Application by BellSouth Corp. for the Provision of In-Region, InterLATA Services in Louisiana. CC Docket No. 98-121, July 7, 1998, at 2.

The advent of xDSL technology can be expected to further stress the ability of ILECs to offer collocation space using traditional methods. xDSL technology has brought a new wave of entry to the local market by carriers interested in providing data services. Although the space needs (per central office) of CLECs using xDSL technology is often far less than the conventional 100 ft^2 minimum,[46] collocation by these carriers will consume scarce central office space if they are held to this obsolete requirement. Smaller, more efficient, collocation approaches will be necessary to accommodate these important new entrants.

Service Intervals: Each ILEC is constrained in the number of collocation applications that it can accept each month. This circumstance is partially due to the number of ILEC work groups involved in the current collocation application process and the availability of qualified vendors to construct the space and enclosures. In New York, Bell Atlantic stated that it can only provide "approximately 15 to 20 physical and/or virtual collocation arrangements per month across New York State."[47] Furthermore, if a CLEC submits more than eight (8) requests in a single month for a particular geographic area (Bell Atlantic has five of these geographic areas in NY), "the due dates for completion of the requested collocation arrangements will have to be negotiated and staggered."[48] Similarly, BellSouth will only respond to up to three (3) applications for space within the same state submitted within a fifteen (15) business day interval.[49] As the policies of

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[46] For instance, the DSL equipment that COVAD Communications seeks to collocate "... is no larger than an average stereo system." Comments of Covad Communications, New York PSC Case No. 98-C-0690 at 4 (June 15, 1998).

[47] Affidavit of Karen Maguire, New York PSC Case No. 97-C-0271, November 3, 1997.

[48] Affidavit of Karen Maguire, New York PSC Case No. 97-C-0271, November 3, 1997.

[49] When a CLEC submits more than three (3) applications in the same state within fifteen business days and BellSouth is processing multiple applications from other interconnectors, BellSouth and the CLEC are to negotiate a prioritization of the requests. See BellSouth Master Collocation Agreement 4.1.1.

these two ILECs demonstrate, CLECs are severely constrained by the number of collocation arrangements the incumbent can establish when multiple CLECs are seeking to collocate, or even a single CLEC is seeking multiple collocation arrangements. Considering the number of ILEC central offices (more than 23,000 nationwide), this constraint is significant.

The Additional Uncertainty of Virtual Collocation: Equipment Maintenance and Security. With virtual collocation, the fate of the CLEC's equipment rests in the hands of the ILEC. Although the CLEC has the ability to monitor its equipment, it must rely on ILEC technicians to perform routine maintenance and emergency repair work on the equipment. As a result, the CLEC has no control over the timeliness or quality of the work being performed. Furthermore, without access to its own equipment, it becomes difficult for a CLEC to coordinate a system-wide upgrade of its facilities with its equipment vendors.[50]

Together, the above factors increase the cost, reduce the flexibility and delay the availability of traditional collocation. Before turning to reforms which can correct these problems, however, it is useful to consider how the competitive market addresses these same concerns.

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[50] The basic design of modern telecommunications equipment can loosely be described as a "processor-driven frame" into which individual "line cards" are inserted to define a particular function or capability. This modular approach means that manufacturers can install upgrades by swapping "line cards" with newer versions. Of course, to effect such an upgrade requires that the CLEC be able to provide its manufacturer (or its own technicians) direct access to its equipment -- access that would be foreclosed (if not made far more difficult) by virtual collocation.

III. Learning from Collocation in Competitive Markets

Although collocation is extracted from an ILEC though legal obligation, it is a standard and favored business practice wherever competition is the prevailing market form. Long distance carriers, Internet providers and CLECs all have promoted collocation arrangements as an important and routine part of their businesses. Competitive collocation behavior can provide a useful template for reforming ILEC collocation practices.

A. The Long Distance and Internet Models

The competitive industry with the longest experience with collocation is the long distance industry. Early in its development, the competitive long distance industry learned the benefits of collocated network facilities for reliability, efficiency and cost. Network nodes became equipment "condominiums," with multiple carriers sharing points-of-presence.[51] These arrangements were intended to foster a cooperative relationship between the collocator and space provider, with the intent of establishing a strategic relationship that would lead to future sales of capacity.

The protypical provider of long distance collocation services during the early years of competition was WilTel, a carrier with a national network focused exclusively on providing wholesale long distance capacity to other retail providers. Today, as part of MCI WorldCom, this commitment continues with a strong policy favoring collocation. Like many CLECs and

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[51] A "point of presence" (POP) is a terminal point of an interexchange network where interconnection with the ILEC network for access service occurs. These and other locations where interexchange carrier transmission or switching equipment is located are generally referred to as "network nodes."

Internet providers, MCI WorldCom/WilTel does not even allow cages in the areas it has established for collocation due to the inefficient use of space that would result. Security is achieved through the use of the "locking cabinet" -- in fact, its standard collocation service is defined as space within a locked and vented cabinet.[52] Unlike ILEC collocation arrangements, competitive alternatives do not relegate each collocating carrier -- carriers which are, first and foremost, considered customers -- to its own caged environment. Equipment space is defined as rack (sometimes called an equipment bay) space to maximize available space and minimize cost.[53]

In addition to establishing the blueprint for future competitive collocation policies, the long distance example is instructive for another reason as well. When the ILECs are able to offer long distance services, they too will directly benefit from the competitive collocation policies favored by this industry. As the ILECs seek to collocate equipment on the premises of their interLATA transmission vendor, they will not be told -- indeed, in many instances, will not even be permitted -- to first establish a costly and inefficient cage. Rather, the basic "unit" of collocation will be the standard equipment rack(s), located alongside the equipment of other carriers. ILEC collocation practices should be reformed to achieve a similar symmetry between monopoly local, and competitive long distance collocation offerings.

The Internet model provides additional confirmation that security concerns in competitive environments are addressed without resorting to a mandatory cage. The Internet is more accurately viewed as a collection of networks which interconnect at a number of Network Access

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[52] In those areas where locking cabinets cannot be accommodated, MCI WorldCom/ WilTel still offers collocators rack space, despite the lower level of security such arrangements afford.

[53] Recognizing that some locations have limited space, some long distance carriers limit collocation to customers purchasing a minimum amount of capacity such as a DS3.

Points (NAPs). These NAPs are analogous to a collocation arrangement, since multiple carriers locate equipment in these centers. Typically, these Network Access Points (such as MAE East and MAE West) operate as "collocation farms", with each carrier's equipment located side-by-side in a completely uncaged environment. Security is typically provided by restricting access to technicians that are issued "smart-cards" which automatically register the time and place of entry, and remote video surveillance from a network control location located hundreds (and, in some instances, thousands) of miles away.

The Internet example is particularly useful to judge the reasonableness of any claim that cages are necessary for security. It is estimated that the MAE East interconnection point alone handles more than 60 percent of all *worldwide* Internet traffic (including 85 percent of all intra-European traffic), and roughly 40 percent of US domestic traffic.[54] Consider the significance of these statistics. The Internet is as vital to commerce as the traditional voice network, yet its providers have never accepted the premise that each provider must be isolated to its own, uniquely secure, environment.

The principal lesson is that the collocation practices found with the typical ILEC are an aberration when viewed from an industry perspective. The caged-environment that is so central to the ILEC model, has no precedent in competitive markets, even though similar security concerns apply. The difference is not with the *concern* for security, the difference lies in defining what security measures are *reasonable*.

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[54] Internet Affidavit of Robert G. Harris, CC Docket 97-211 at 29 (Petition before the FCC to Approve the MCI WorldCom Merger) (filed March 13, 1998) at 29 (citing John C. Dvorak, "Breaking Up the Internet Logjam", *PC Magazine* at 87 (April 8, 1997); and P. Merrion, "What a Tangled Web Users Weave", *Crain's Chicago Business* (December 9, 1996).

B. Collocation Choices Offered by Competitive Local Exchange Carriers

Perhaps the most relevant template for competitive collocation can be found in the local market itself with the actions and offerings of the CLECs. Unlike the ILECs, competitive entrants have no desire to foreclose access to their networks by customers, including other carriers. As a result, the CLEC industry approaches collocation with the goal of accommodation and the desire to make their networks and space as accessible as possible. In the CLEC community, collocation is a *product* -- a product like all others which needs to be provisioned inexpensively, rapidly, and with a minimum of complication and cost.

The basic collocation offering of a typical CLEC *is not* caged collocation.[55] The CLEC industry recognizes that customers have differing requirements, with only some customers requiring caged space. The central goal of collocation is the placement of equipment -- equipment which increasingly requires rack space, not floor space, to meet the customer's needs. Although some CLECs provide customers the choice of a caged space,[56] the standard CLEC offering is defined as rack or cabinet space, or, alternatively, floor space offered in increments sized to accommodate standard racks and equipment bays. The purpose behind this offer is simple. Uncaged collocation space can accommodate far more collocation customers than a caged environment. A competitive firm views the efficient utilization of its space as an important objective because it *wants* to attract collocation customers.

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[55] As noted earlier, several providers (MCI WorldCom/WilTel and Intermedia to name a few) do not even offer a caged option.

[56] For instance, although ICG Communications offers potential customers the option of a caged environment, it discourages this option due to the inefficient use of space.

Notably absent from the competitive collocation product line is the paradox known as "virtual collocation." In essence, virtual collocation is a byproduct of the ILEC's insistence on caged collocated space. The justification for virtual collocation is that sufficient space for a collocation *cage* does not exist. However, space is available for the collocated *equipment*. The ILEC's virtual collocation "solution" is to collocate the equipment, but to deny the entrant subsequent access for maintenance or upgrade.[57] In contrast, the competitive solution is to make the equipment space directly accessible by offering uncaged space, including rack space itself.

Like the long distance and Internet examples cited above, security concerns in competitive collocation arrangements are addressed through common-sense means: clearly identified equipment, locking cabinets, card access, and escorted access. For those CLECs which require escorted access, it is typically included in the non-recurring charge associated with the initial installation of collocated equipment.[58]

Competitively provided collocation arrangements are also sensitive to the customer's need for speedy implementation, even in those relatively complex instances where a cage is requested by the collocator. The following describes the procedure and intervals used to establish a collocation cage offered by a typical CLEC:

* A potential customer requests collocation space, filling out a simple 5 page questionnaire with the help of a salesperson.

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[57] As explained above, this result is accomplished by leasing the equipment to the ILEC and relying on ILEC technicians for subsequent work.

[58] For instance, ICG provides its collocated-customers or their vendors four hours of escorted access to initially install equipment as a standard feature of its collocation service.

* The regional VP overseeing collocation space approves/rejects the collocation request within 5 days.

* Customer/commissioned-salesperson completes collocation agreement and forwards it to legal department.

* Legal department has 5 days to complete review of collocation agreement.

* The standard provisioning interval for caged collocation space is 30 days.

This standard procedure can deliver a fully prepared collocation cage to a customer within 40 days -- far less than the time it takes a typical ILEC to provide a similar environment. For instance, Bell Atlantic's *construction* interval alone is 76 business days, while US West cites 90 calendar days, and BellSouth and Pacific Bell have 120 calendar day intervals -- and these intervals do not include the additional time consumed by the application and acceptance processes.

C. Lessons from Competitive Collocation

As noted above, the competitive experience has given rise to set of collocation choices quite different than that found in ILEC agreements. Competitive collocation arrangements are simple, customer-oriented and affordable. The key lessons from the competitive paradigm can be summarized as follows:

Rack Space or Floor Space: Competitive collocation arrangements begin with the recognition that not all entrants desire floor space. Many entrants have simpler needs, desiring only the ability to lease rack space to mount equipment. Although floor space is an option, floor space is offered in increments small enough for an entrant to mount its own rack (i.e., equipment bay) without the inconvenience and cost of caged-space.[59]

Security: Competitive collocation arrangements approach security with a large measure of common sense. The first level of security is *labeling* -- by properly labeling equipment, mistaken contact will be avoided. Competitive collocation arrangements also provide customers with the option of protecting their equipment with a locking cabinet. Additional security is provided by card-access that tracks when technicians have had access to the common space, or in some instances, access escorted by the CLEC/IXC technician.

Sharing: Because competitive collocation arrangements are so flexible, there is less need to share space. Nevertheless, competitive collocation arrangements do not typically limit a customer from sharing its equipment or space with another carrier.

Restrictions: Competitive collocation arrangements do not generally limit the services or uses of collocated equipment by a carrier.

Reasonable Prices: Competitive collocation arrangements are intended to *encourage* collocation and prices reflect that basic desire. Table 4 outlines the typical pricing available

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[59] To place this distinction in perspective, even Bell Atlantic acknowledges that the space required for an entire rack/bay of collocated equipment requires only 15 ft^2 of floor space, far less than the 100 ft^2 minimum associated with conventional collocation. See Bell Atlantic New York, *Secured Collocation Open Physical Environment (SCOPE) Service Description* at 3 (June 23, 1998).

from CLECs and IXCs for the standard competitive offering (i.e., a collocated equipment rack in common collocation space):

Table 4:
Summary of Competitive Collocation Pricing
(Prices Applicable to a Collocated Rack in Common Space)[60]

Carrier	Recurring	NRC	Power	Comment
A	$300	$1,000	$280/rack	$25 charge for 2 access cards.
B	$975	$1,000	Included	2 rack minimum, cabinet provided.
C	$700	N/A	Not Cited	Includes cabinet.
D	$500	$2,000	Included	
E	$700	$1,000	$40 per 5 amp	2 year minimum term.
F	$400 $1,000	$4,000 $8,000	$15 per amp	26" by 18" rack 42" by 30" rack
G	$1,135	$2,287	Included	2 rack minimum.
H	$675	$5,500	Included	Term discounts available.
I	$400	$525	Included	Rate does not include cabinet.

With this basic description of competitive arrangements serving as the template, it is now appropriate to turn to specific proposals to reform ILEC collocation policies.

[60] The pricing information outlined in this table has been compiled by CompTel to illustrate the general range of competitive collocation prices offered by CLECs and IXCs. Prices from any individual carrier in any particular market will vary.

IV. Recommended Collocation Reforms

A. Cageless Collocation Options

The traditional vision of collocation -- a dedicated cage equaling 100 square feet -- is unnecessarily costly and inflexible, particularly when compared to the collocation profile of new technologies. Continual advances in microelectronic circuitry translate to an interest into collocating equipment of decreasing dimension and increasing functionality. Further, as competition expands beyond urban markets to areas with smaller central offices and lower density, there will be a corresponding need for more efficient and less costly collocation options. Traditional collocation rules which isolate CLECs in dedicated, caged space or which limit the types and uses of collocated equipment are inconsistent with these fundamental trends.

The principal impediment to cost-effective collocation is the ILECs' insistence that physical collocation equates to a dedicated, caged environment. The practice of caged collocation, however, is nothing more than an ILEC convention, born at a time when potential collocators were first entering the market and had few legal rights.[61] There is nothing in the Telecommunications Act of 1996 that requires (or even suggests) that the entrant's right to physical collocation should be constrained to a caged environment.[62] The single most important reform of ILEC central office collocation policy is the elimination of the mandatory cage.

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[61] See discussion supra Section II.

[62] Section 251(c)(6) describes the ILEC's obligation to provide collocation:

> The duty to provide, on rates, terms, and conditions that are just, reasonable, and nondiscriminatory, for physical collocation of equipment necessary for interconnection or access to unbundled network elements at the premises of the local exchange carrier, except that the carrier may provide for virtual collocation if the local exchange carrier demonstrates to the State commission that physical collocation is not practical for technical reasons or because of space limitations. U.S.C.A. 251 (c)(6)(west supp. 1996).

There are two basic approaches to cageless central-office collocation:

Shared Space Cageless Collocation: This form of cageless collocation establishes a "shared area" that is dedicated to the collocation of CLEC equipment. This shared area would be separated from ILEC equipment, but within the shared area, the equipment of individual CLECs would be collocated side-by-side without the imposition of cages or other walls. These shared areas would be fully accessible to the CLECs' authorized employees or agents for installation, maintenance and repair. Shared Space collocation options include space on pre-installed racks as well as floor space increments flexibly sized to allow an entrant to install its own dedicated rack.

Bell Atlantic has recently proposed offering a "shared space" arrangement in New York. In addition, both US WEST and BellSouth offer arrangements which allow CLECs to collocate equipment in a common area without cages. These offerings prove that cageless collocation is technically feasible and appropriate.[63]

Common Space Cageless Collocation: Common Space cageless collocation allows the CLEC to install its equipment within the same conditioned environment as the ILEC's equipment. CLECs would be provided identified space within the central office, in the same environment as the ILEC's equipment, but with sufficient physical separation (i.e., a specific aisle) to clearly distinguish CLEC from ILEC equipment. With respect to equipment location, Common Space cageless collocation would be similar to virtual collocation. Significantly, however, the CLEC

[63] Although as previously indicated, such options are not appropriate for combining unbundled network elements. See *Broadening the Base: Combining Network Elements to Achieve Widespread Local Competition,* July 1998, Section III B.

would not be dependent on the ILEC to install, maintain and repair its equipment -- the penalty today imposed with virtual collocation.

The principal benefit of Common Space collocation is that it uses space most efficiently. This characteristic is becoming increasingly important as the space available to establish CLEC-only areas becomes more limited or exhausts entirely. For instance, Bell Atlantic has indicated that of seventy (70) central offices it surveyed for collocation space, seventeen or 24% no longer have space for dedicated physical collocation.[64] Furthermore, under the Common Space collocation option, there is no meaningful difference in the space used by the ILEC and the CLEC, thereby best satisfying the 1996 Act's requirement for nondiscrimination.[65]

Either cageless option would be more desirable than a traditional collocation arrangement because both should result in lower cost. Cageless collocation should be less costly than traditional physical collocation because it uses space more efficiently, and reduces (if not eliminates) construction costs associated with cages, segregated access and conditioning. These cageless options should be less expensive than virtual collocation because there is no need to train ILEC technicians or pay inflated ILEC charges for routine maintenance or system upgrades. Most importantly, these options allow the CLEC to remain independent from the ILEC for the *quality* of the service, as well as the *types* of services, the CLEC provides its customers.

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[64] April 15, 1998 letter from Bell Atlantic to the New York Public Service Commission. Although there are 522 Bell Atlantic central offices in New York State, Bell Atlantic only reported the availability of physical and virtual collocation in the 70 offices listed in its letter. It is unclear what the status of available space is in the remaining 452 offices. Of the 70 surveyed, 57 were located in the New York Metro LATA.

[65] This option should eliminate all potential areas of discrimination, except for price.

Table 5 compares the Shared Space and Common Space cageless options to traditional virtual and physical collocation. This table illustrates how cageless options combine the best features of the traditional methods:

Table 5: Comparing Traditional Collocation with Cageless Collocation Options

Attribute	Traditional Physical Collocation	Traditional Virtual Collocation	Shared Space Collocation	Common Space Collocation
Basic Unit of Collocation	100 ft^2 Cage		Dedicated Equipment Bay/Rack, Shelf Space in Common Rack	
Collocator-Space Separated from ILEC?	Yes	No	Yes	No[66]
Restrictions on Sharing?	Yes	Yes	No	No
CLEC-Access to Equipment?	Yes	No	Yes	Yes
CLEC Owns Equipment?	Yes	No	Yes	Yes

The issue most relevant to the introduction of cageless collocation is security. As discussed earlier in this paper, it is important to appreciate that security is not an absolute concept. Rather, there are differing levels of security have been found that do not require

[66] It is expected that the CLEC's equipment would not share the same rack/bay as the ILEC's equipment. The degree of separation between the CLEC's equipment and the ILEC, however, should be the minimum amount necessary to establish a clear identification of each's equipment.

physical cages with increasing levels of protection and cost. The important goal is to achieve a reasonable balance between prevention and risk.

As a threshold observation, it is important to recognize that access to central office space is already controlled. The issue is not *providing* a secure environment, but *sharing* that secured environment without diminishing its effectiveness. As a result, the security question relevant to both cageless collocation options[67] is how to best provide multiple carriers with access to shared/common space, while protecting each carrier's equipment to the maximum extent reasonable. Consequently, the security alternatives presented below are principally intended to address security within the shared/common area, with the expectation that access to the space is already effectively controlled.[68]

Labeling: The most common risk is human error, a risk that exists independently from collocation. To prevent human error, the simplest form of security is proper labeling to which assures that a technician can easily identify its equipment. Although this security measure may seem overly simplistic, it is considered one of the most useful measures by technicians in the field.

Verified Access: One effective security measure is the ability to identify with precision those technicians with access to the shared/common area at the moment trouble occurs. A variety of means can be used to reasonably track access, including: manned access with sign-in, or more

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[67] The security issues presented by the Shared Space and Common Space collocation options are effectively the same. The only difference between the options is the inclusion of a single additional carrier's equipment, the ILEC. Increasing the number of collocators by one, however, should not change the need to establish a security solution acceptable to the industry as a whole.

[68] Several of the listed security approaches are not mutually exclusive, but may rather be used together or in combination.

efficiently, access controlled by a "smart" key card. Smart card entry automatically records who entered the space, the date and time they entered, and the time they left. As a result, the smart card data would provide the ILEC/CLEC with the details of who (including the ILEC's own employees) was in the area at the time of failure. Verified access is a popular security measure in competitive applications, including the principal security measure (with remote surveillance) used at the Internet's Network Access Points.

Video surveillance/recording: Remote measures can also be used to improve security. The principal purpose for these surveillance systems is to assist in the positive identification of any security violation. Consequently, there is no need for real-time surveillance. Instead, cameras could feed continuous recording systems for later review.

Bonded Access: To ensure that each carrier has the appropriate incentive to carefully train its employees/vendors, it may be reasonable to require that technicians with access to the common area be bonded. This approach could be combined with a set of predefined penalties for clear violations of common area policies, such as movement beyond the approved area in the case of the Common Space option.

Escorted Access: A more aggressive security measure is escorted access. This arrangement requires that a technician be escorted whenever he or she is in the common area. This approach may be viable in large offices where manned security is readily available at a reasonable cost. Of course, even where access is escorted, it should not require a highly trained and costly ILEC technician. The function of the escort is simply to assure that the CLEC's technician works only on its equipment -- equipment which should be clearly labeled. This basic escort function can be performed by the ILEC's security staff (e.g., normal building entry guards, where available) at a cost far more economical than the cost of a trained ILEC technician.

Locking Cabinets: The most prevalent form of security in competitive collocation arrangements is the use of locking cabinets. While the locking cabinet is a prevalent form of *potential* security, reports from the field indicate that these cabinets are generally *unlocked*, providing further evidence that the practical concern with security is less than that typically described in a regulatory context.

Third Party Access: Although the most common risk is human error, ILECs have expressed continuing concern regarding deliberate conduct that would harm their equipment. One approach to address this concern is to limit access to third parties who would provide installation, maintenance and repair services. Because the ILEC would represent the largest potential customer of such third-party vendors, these vendors would have a substantial incentive to make sure that their technicians operated professionally.[69] It may even be reasonable for the ILEC to establish a certification procedure for third-party vendors -- assuming that such a procedure can be conducted rapidly and efficiently.

The point of the above list is to demonstrate that reasonable security concerns can be addressed through reasonable means. Security does not justify limiting physical collocation to a caged environment. Cageless alternatives are less costly, they can be provisioned more rapidly, and they use space more efficiently. As such, it should be no surprise that they are the favored collocation arrangement in competitive applications.

[69] One should also expect that CLEC technicians -- technicians that are frequently former ILEC employees -- will operate in a professional and cautious manner.

B. Improving Traditional Collocation

In addition to offering new forms of cageless physical collocation, there are a number of simple reforms that can be adopted to improve traditional collocation. The following measures are intended to improve the CLECs' ability to obtain traditional collocation arrangements in a more efficient, timely and economical manner. In some instances, our proposed reforms are already agreed to by one (or more) ILECs, but are not yet a national norm.

Improve Available Space:[70] When a CLEC is denied a collocation arrangement as a result of the lack of available space -- or if the ILEC publishes a report indicating that no space is available for collocation in specific central office(s) -- the following process should be required:

* The ILEC should provide the state commission and any requesting CLEC with a detailed floor plan of the central office(s) where they claim no available space. This plan should identify all floor space in the central office, how it is currently being used, and what space, if any, is reserved for future use. Furthermore, the plan should indicate what equipment, if any, is retired in place.

* Space used for functions that can be established outside the central office (e.g. administrative offices), or space being occupied by obsolete equipment, should be reassigned and made available for collocation.

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[70] In addition to the reforms cited here to improve available space, regulators should be aware that ILECs frequently pursue policies that deliberately waste collocation space, thereby artificially creating potential shortages. The most offensive of these strategies is the position that entrants must obtain collocation space in order to combine network elements. CompTel addressed this issue in detail in an earlier White Paper, however, and will not repeat its analysis here. See (*Broadening the Base: Combining Network Elements to Achieve Widespread Local Competition*, July 1998).

* CLECs and the state commission should be allowed to conduct a walk-through in any premise where collocation is being denied. If the CLEC finds space that would be suitable for its collocation, the ILEC should be held to a rebuttable presumption that such space can be made available.[71]

* Available space should be assigned on a first-come, first-served basis. In no instance, however, should an ILEC affiliate be permitted to obtain more than 1/3 of the available collocation space in any central office.[72]

* CLECs are bound by strict rules that prevent them from warehousing collocation space.[73] In addition to these rules, however, the cost of collocated space to the CLEC also prevents it from inefficiently reserving space for potential future purposes. Because collocation charges do not provide a comparable incentive for the ILEC (or any wholly owned affiliate), regulators must establish (and enforce) clear rules limiting the warehousing of space by the incumbent.[74]

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[71] Of course, there should be no charge for conducting a walk-through.

[72] The potential existence of an ILEC-CLEC affiliate raises a number of serious issues, most of which are beyond the scope of this White Paper. The intent of this rule, however, is to assure that at least two legitimate competitors, equal in size to the ILEC's affiliate, are able to collocate and compete.

[73] There are typically not, however, systematic reporting requirements that would help enforce such rules.

[74] Existing federal rules do not provide sufficient guidance in this area. For instance, the Local Interconnection Order para. 604 states:

> Incumbent LECs are allowed to retain a limited amount of floor space for defined future uses. Allowing competitive entrants to claim space that incumbent LECs had specifically planned to use could prevent incumbent LECs from serving their customers effectively. Incumbent LECs may not, however, reserve space for future use on terms more favorable than those that apply to other telecommunications carriers seeking to hold collocation space for their own future use.

This provision fails to recognize that CLECs have no economic incentive to inefficiently warehouse collocation space, and therefore strict rules need not apply. In contrast, an ILEC's claim that it has

Smaller Physical Collocation Arrangements: Most ILECs have a minimum space requirement of one hundred (100) square feet for traditional physical collocation. This requirement can force a CLEC to purchase more space than it needs, wasting scarce collocation space. Collocating CLECs should be able to purchase caged space in more flexible increments, such as a twenty-five (25) square feet minimum with additional space available in ten (10) square foot increments.[75]

Improvement on Intervals and Throughput: ILECs should be required to conduct "pre-request" site surveys to identify offices with potential limitations on collocation. ILEC offices should be prioritized based on forecasts received from CLECs. A pre-request survey process should provide advance warning if space is not available or requires conditioning, thereby reducing the provisioning interval once an order is received from a CLEC.

The ILECs should also take positive measures such as contracting with additional vendors to allow for a quicker turnaround of collocation arrangements.[76] The ILECs should make every effort to identify and certify additional third-party vendors who will be available to meet collocation demands. In addition, standardized service intervals (comparable to the competitive intervals shown above) should be established for each step in the collocation

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reserved space for a future use can create an effective barrier to competition without imposing any real cost on the ILEC other than the "opportunity cost" of lost collocation revenues from the CLEC.

[75] Bell Atlantic has recently agreed to provide CLECs with collocation cages smaller than the standard 100 ft^2 minimum.

[76] Bell Atlantic, for instance, has admitted that "[o]ne constraining factor for both BA-NY and the collocators is the availability of technically-proficient, qualified third-party vendors." Affidavit of Karen Maguire, New York Public Service Commission Case No. 97-C-0271, November 3, 1997.

process. The goal should be a clearly defined collocation product, and not the case-by-case, central office by central office, practice that exists today.

Remove Unnecessary Restrictions on Equipment Type and Use: Most ILECs limit the type of equipment that can be collocated to transport equipment. These restrictions do nothing but create a competitive barrier that adds costs and delay for the CLEC as well as allow the ILEC to control the pace at which new technologies are deployed. CLECs should be able to collocate *any* type of equipment that will allow them to compete effectively with the ILEC. The sole criteria that should determine what equipment can be collocated should be the size of the equipment, and the available space. It makes no sense to prohibit a remote switching unit, for instance, which would generally require no more space than the transport equipment it replaced.

In addition, CLEC should be free to use its collocated equipment free from any artificial restrictions placed on it by the ILEC. Bell Atlantic has taken the position that a CLEC can install a remote switching unit, but that the equipment cannot then be used for switching. Pacific Bell has placed a similar (but somewhat less constraining) restriction on remote switching units installed in collocated space. Pacific will allow the remote switching unit to switch calls within the office, but it may not terminate traffic to another switch. Both examples are restrictions with no technical rationale -- they are simply attempts to competitively hamper the CLEC by preventing it from using the full capability of its investment. In contrast, SBC allows CLECs to both install and fully use collocated remote switching units.

Remove Restrictions that Prevent Shared Collocation Space: Any restriction which prevents a CLEC from sharing or subleasing collocated space should be removed. These restrictions serve no valid technical or security purpose. Rather, they unreasonably increase costs for smaller CLECs and can lead to the premature exhaust of usable space through inefficient utilization.

Implementing shared collocation is straight-forward. The ILEC simply continues to collect collocation-related charges from the primary CLEC, while orders for individual network elements or interconnection facilities would be billed to each CLEC sharing the facility. Both US WEST and Bell Atlantic (in New York) now allow carriers to share collocation space, albeit on terms which may be unnecessarily restrictive.[77]

Reduce the Cost/Price of Providing Collocation: Collocation costs today vary widely from ILEC-to-ILEC and state-to-state. Many of these rates bear little relationship to their underlying cost.[78] Of course, it is important that regulators carefully scrutinize the underlying cost basis of any charges. It is equally important, however, to remove any policy or practice which creates unnecessary costs.

Finally, a more equitable process for allocating cost to the CLECs for the preparation of unconditioned space must be developed. Under current procedures, the initial cost of space preparation is levied entirely on the first CLEC that requests space. This CLEC receives a prorated rebate as other CLECs collocate in the office. A preferable alternative would be for the initial CLEC to pay site preparation costs based on the percentage of the total space it is occupying.[79] As additional CLECs collocate, the ILEC would assess each a site preparation fee

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[77] For instance, requiring that one CLEC accept responsibility for all recurring charges billed on facilities terminated to a single cage.

[78] For example, there is no justification for *recurring* cross-connection charges. The typical cross-connect is a pair of wires anywhere from 20 to 200 feet in length, connected to terminals on a frame. Once the manual *non-recurring* work is performed to run the wires and establish these connections, there is no reason for a continuing *recurring* charge. Each cross-connection takes a minimal amount of space, and generally requires no maintenance (assuming they were installed correctly and have not been disturbed by further frame activity).

[79] For example, if an ILEC spends $300,000 to condition a one thousand square foot collocation space, and the first CLEC uses ten percent or one hundred square feet of this total, then

based on the amount of space each CLEC occupies. This is the general approach now used by Bell Atlantic in New York and there is no reason that other ILECs (and Bell Atlantic in its other states) cannot conform to this standard.[80]

V. Conclusion

The typical progression of regulatory policy is to begin with the simple and then, with the advantage of experience, implement reforms of increasing sophistication and complexity. In the case of collocation, however, the opposite evolution is appropriate. The prevailing framework for physical collocation -- the dedicated caged environment -- is inordinately expensive, slow and inefficient.

The most significant improvement to collocation can be made by simply eliminating the ILECs' policy that physical collocation requires a cage. The nondiscriminatory access to an ILEC's premise guaranteed by the 1996 Act is best satisfied by providing CLECs access to the *same* space as the ILEC, without the cost or complication of a cage. Cageless collocation is the standard in every competitive application -- in the long distance industry, in the Internet industry and with CLECs themselves. It is now time for this competitive standard to become the standard offering of the ILECs as well.

In addition, there are a number of actions which can improve both caged-physical collocation and virtual collocation. Several of the reforms we recommend in this paper have

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the CLEC would be charged ten percent (i.e., $30,000) for site preparation.

[80] CompTel does not endorse, however, that component of the New York plan which would allow Bell Atlantic to reallocate the cost of unused space if future demands fall short of expectations.

been (at least partially) implemented by one or more ILEC. However, these reforms are not yet national consensus practices. All are intended to reduce the cost, complexity and excessive provisioning intervals which today limit the competitive value of collocation.

Amid the details of our analysis, however, is a broader message and more fundamental conclusion. The purpose of collocation -- indeed, the purpose behind each of the carrier-entitlements in the 1996 Act -- is to foster a competitive environment for the benefit of consumers. Regulators should be concerned with the speed, efficiency and utility of collocation because it will determine the choices and prices paid by consumers. The unnecessarily complex, expensive and slow collocation process that typifies today's environment results in higher prices, fewer choices and delayed innovation that directly impacts customers. The time is now to reform collocation and come one step closer to the competitive vision embraced by Congress when it passed the Telecommunications Act of 1996.

Typical Procedures to Order and Provision Traditional Collocation

Step	Physical Collocation	Virtual Collocation
Application	CLEC issues an application and appropriate fees to ILEC specifying its collocation requirements (i.e., ILEC premises where collocation is required, floor space requirements, technical equipment requirements, etc.). This application triggers various organizations within the ILEC (e.g., facility planners, space planners, equipment engineers) to review the application and make an assessment of the ILEC's ability to meet the CLEC's collocation requirements.	
Application Response	ILEC response to CLEC includes results of investigation process triggered by application such as whether the space requested is available or, if not, how much space (if any) is available. Response also includes the configuration of the space, if special construction/conditioning is necessary to make space available and the cost for the collocation arrangement.	Once the ILEC has completed its design and planning activities, it informs the collocator of the floor space and power requirements for the equipment the CLEC wishes to install. The ILEC also provides the CLEC with a list of vendors certified to perform the equipment installation.
Firm Order	After a specific interval given to the CLEC to review the ILEC's response the CLEC must issue a firm order and associated fees to the ILEC to begin the construction process.	
Joint Planning Session	Upon receipt of the firm order and fees the ILEC will contact the CLEC to establish a collocation planning meeting. During this meeting the two parties will discuss and come to agreement on design of collocated space (if applicable), equipment configuration, power requirements, etc. Construction intervals are also established during these sessions.	

Procedures to Order and Provision Traditional Collocation (Continued)

Step	Physical Collocation	Virtual Collocation
Space Preparation and Construction	During this phase, space preparation work such as removal of retired equipment, removal of hazardous materials, mainframe additions, etc., is performed if this work is necessary to make premises space available to CLEC(s). If there is readily available space for collocation then this phase involves the construction of the collocation cage for the CLEC's equipment.	Not Applicable
Equipment Installation	After the collocated area is prepared and jointly inspected by the ILEC and the CLEC (physical collocation only), the CLEC, using an approved vendor, can begin to have its equipment installed in the collocated space (or, in the case of virtual collocation, the ILEC's central office space). Also, in the case of virtual collocation, the ILEC will function as the installation project manager and will, in conjunction with the equipment installation contractor, determine the installation interval. Along with this work, the ILEC, or its vendor, needs to install the equipment (e.g., additional blocks on the main distribution frame) and the cabling to the common (POT or POI) frame in the collocation area. This installation is necessary to allow the CLEC to interconnect with the ILEC or obtain access to the unbundled elements.	

Procedures to Order and Provision Traditional Collocation (Continued)

Step	Physical Collocation	Virtual Collocation
Training of ILEC Personnel	Not Applicable	The CLEC is responsible for training the ILEC's technicians who will be responsible for maintaining this equipment. This training is done at the CLEC's cost. The CLEC is also responsible for providing the ILEC all of the test equipment, tools and spare plug-ins the ILEC's technicians will need to maintain and repair the collocated equipment.
Testing and Acceptance	Upon completion of the equipment installation, the parties perform a series of tests to insure the equipment has been installed correctly, and is functioning properly, there is continuity between the ILEC's frame(s) to the common frame (physical collocation) or to the CLEC's equipment (virtual collocation), and there is continuity from the common frame to the collocated equipment (physical collocation). Successful completion of this testing allows the CLEC to begin to offer service using the equipment installed in this collocation arrangement.	

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of Rebuttal Testimony of Joseph Gillan on behalf of ACI Corp., AT&T Communications of the Southern States, e.spire Communications, Inc., MCI WorldCom, Inc., Supra Telecommunications & Information Systems, Inc., and Time Warner AxS of Florida, L.P. in Docket Nos. 980946-TL, 980947-TL, 980948-TL, 981011-TL, 981012-TL, and 981250-TL has been furnished by Hand Delivery (*) and/or U.S. Mail to the following parties of record this 7th day of May, 1999:

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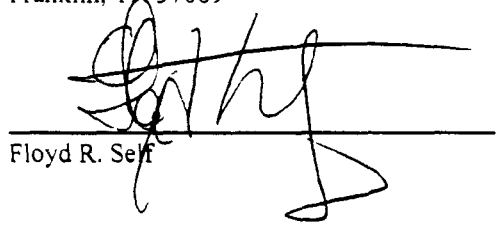

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