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Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Deployment of Wireline Services Offering Advanced Telecommunications Capability	)	CC Docket No. 98-147
	)	

FOURTH REPORT AND ORDER

Adopted: July 12, 2001 **Released:** August 8, 2001

By the Commission: Commissioner Abernathy not participating; Commissioner Martin approving in part, concurring in part, and issuing a statement.

Para.

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I. INTRODUCTION

1. In this Order, we reevaluate provisions of our collocation rules on remand from the United States Court of Appeals for the District of Columbia Circuit. The remanded rules determined which equipment an incumbent local exchange carrier's (incumbent LEC's) competitors might collocate in the incumbent's premises pursuant to section 251(c)(6) of the Communications Act of 1934, as amended (Communications Act or Act).[1] Those rules also required that an incumbent LEC allow collocating carriers to install and maintain cables connecting different carriers' collocated equipment within the incumbent's premises.[2] In addition, the remanded rules allowed requesting carriers to determine where within the incumbent LEC's premises their physical collocation space will be located, precluded the incumbent from restricting physical collocation to separate or isolated rooms or floors, and precluded the incumbent from requiring the construction of separate entrances for physical collocators to use in accessing their own equipment.

2. On remand, we conclude that equipment is "necessary for interconnection or access to unbundled network elements" within the meaning of section 251(c)(6) and thus may be collocated if, absent deployment of the equipment, the requesting carrier would, as a practical, economic, or operational matter, be precluded from obtaining "equal in quality" interconnection or "nondiscriminatory access" to unbundled network elements from the incumbent LEC. We also limit which multi-functional equipment a requesting carrier may collocate. We further conclude that while an incumbent LEC need not allow collocators to install and maintain cross-connects between different carriers' collocated equipment, an incumbent LEC itself must provide these cross-connects upon reasonable request. We conclude, in addition, that an incumbent LEC may decide where collocated equipment will be placed within its premises as long as the incumbent acts reasonably and nondiscriminatorily, and we specify minimum standards defining reasonable and nondiscriminatory behavior in this context. We also determine that an incumbent LEC may separate the space physical collocators occupy and the entrances to that space from other space and entrances within its premises, except in certain limited circumstances.

II. BACKGROUND

3. In general, in order to interconnect with an incumbent LEC or to access an incumbent LEC's unbundled network elements, competitors must be able to directly access the incumbent's facilities with their own equipment. The most practical and efficient places in an incumbent's network where this direct access can occur are those centralized points where

[1] 47 U.S.C. § 251(c)(6).

[2] These cables are referred to as cross-connections or cross-connects. We define cross-connects in paragraph 58, *infra*.

individual, subscriber-generated telecommunications traffic is aggregated onto common links for transmitting the traffic through the network or onto other networks. Collocation allows competitors to place their own equipment directly into these centralized points on the incumbent's network.

4. In the 1996 Telecommunications Act (1996 Act),[3] Congress specifically required incumbent LECs to allow competitive telecommunications carriers to collocate equipment at incumbent LEC premises, enabling facilities-based competitors to provide a full array of competitive local exchange, exchange access, and other telecommunications services. Through its experience over the last five years in implementing the 1996 Act, the Commission has learned that only by encouraging competitive LECs to build their own facilities or migrate toward facilities-based entry will real and long-lasting competition take root in the local market.[4] At the same time, the Commission has recognized that most facilities-based providers still require the use of some component of the incumbent's local network in order to be able to compete with the incumbent and to justify the huge investments in infrastructure that are necessary to build out their own telecommunications networks.[5] In addition, whether or not a competitor builds a wholly-owned network or uses parts of the incumbent's network, most alternative providers inevitably must interconnect their new networks with the existing network of the incumbent in order for customers of both networks to communicate with each other. Therefore, collocation continues to play an essential role in fostering competitive facilities-based entry and expansion into the local market.[6]

5. Significantly, over these same five years, the rapid pace of development and investment in innovative technologies has ushered in a fundamental change in the potential services and capabilities available to end users. In particular, the increased use of packet-based technologies has begun to revolutionize the delivery of telecommunications services. In part as a result of opportunities created by the 1996 Act, a burgeoning of new technologies has enabled network builders to begin turning away from the traditional circuit switched network and its

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[3] Pub.L. 104-104, Title VII, 110 Stat. 153 (1996), *codified at* 47 U.S.C. §§ 151 *et seq.* All citations in this Order to the 1996 Act are to the 1996 Act as codified in the United States Code. The 1996 Act amended the Communications Act of 1934.

[4] *See, e.g., Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, Second Report*, CC Docket No. 98-146, 15 FCC Rcd 20913, 21004, para. 246 (2000) (*Second Report on Advanced Telecommunications Capability*). In addition to facilities-based entry, the 1996 Act envisions competitive entry through purchase of unbundled network elements and resale. We note, in particular, that it may not be economically feasible for most carriers to compete for residential customers without substantial use of unbundled network elements, at least based on the costs associated with some current technologies.

[5] *See* Joint Commenters Reply at 5-6 (maintaining that Congress did not expect competitive LECs to replicate an incumbent's network).

[6] *See, e.g.,* Cisco Comments at 5 (arguing that collocation is the key to allowing competitive LECs to enter the market without replicating an incumbent's loop architecture); WorldCom Comments at 5-6 (contending that Congress viewed collocation as fundamental to local competition); Focal Reply at 11-12.

reliance on single-function equipment and rigid routing hierarchies. These new networks employ "cutting edge" developments in computing, packet technology, digitization, and optical transmission to offer customers both traditional voice services and an ever-increasing array of advanced services. The result has been the deployment of technologies that can perform more functions, at greater efficiency and higher speeds, than prior technologies.[7]

6. These changes in technology have not only resulted in the deployment of new equipment that was barely, if at all, used in the public switched telecommunications network five years ago when the 1996 Act was passed, but also have enabled dramatically different network architectures and designs. These changes in technology have enabled providers to choose from myriad network architectures through which to serve end users. Some of these networks rely on centralized hubs to manage traffic flows and thus resemble, despite achieving far greater efficiency, the networks incumbent LECs deployed prior to the enactment of the 1996 Act.[8] Other network designs seek to migrate previously centralized functions to the network's edge.[9] Still others seek to disaggregate what had previously been considered inseparable network functionalities into more discrete components that can be distributed throughout the network.[10] In other words, equipment choices and the attendant network architectures are increasingly becoming more diverse than those available in yesterday's unitary, circuit-switched network environment. Competitors now can – and do – use equipment and network architecture to differentiate themselves. In the end, not all the new technologies and associated architectures may be sustainable. In the past, however, a single monopoly provider would have made this decision; now, the 1996 Act puts the decision in the hands of the marketplace.[11]

7. Indeed, we have previously recognized that, in adopting the 1996 Act, Congress consciously did not try to pick winners or losers, or favor one technology over another.[12] Rather, Congress set up a framework from which competition could develop, one that attempted to place incumbents and competitors on generally equal footing, so that each could share the efficiencies of an already ubiquitously-deployed local infrastructure while retaining independent incentives to deploy new, innovative technologies and alternative infrastructure. The obligation imposed on

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[7] *See, e.g.,* Cisco Comments at 2; Lucent Reply at 2-3; Letter from Christine Mailloux, Regulatory Strategist, Copper Mountain Networks, Inc., to Magalie Roman Salas, Secretary, FCC, at 1 (filed Mar. 1, 2001) (*Copper Mountain Mar. 1, 2001 Letter*); Letter from Richard S. Whitt, Directory/Senior Counsel, Internet/Data Law & Policy, WorldCom, to Magalie Roman Salas, Secretary, FCC, at 2 (filed Mar. 23, 2001) (*WorldCom Mar. 23, 2001 Letter*).

[8] *Copper Mountain Mar. 1, 2001 Letter*, *supra* note 7, at 1; *see also* DSLnet Comments at i; Aptonix Reply at 2-3; ATG Reply at i.

[9] ATG Comments, at Att. 1, p. 1, & Att. 2, p. 1.

[10] *See* Tachion Comments at 2-3; *Copper Mountain Mar. 1, 2001 Letter*, *supra* note 7, at 1-2.

[11] *See* Supra Comments at 5.

[12] *Deployment of Wireline Services Offering Advanced Telecommunications Capability*, CC Docket No. 98-147, Memorandum Opinion and Order and Notice of Proposed Rulemaking, 13 FCC Rcd 24011, 24014, para. 2, & 24017, para. 11 (1998) (*Advanced Services Order*), *recon. denied*, 15 FCC Rcd 17044 (2000).

incumbents to allow for the collocation of competitors' equipment at the incumbents' premises is a critical, if not fundamental, component of this equation. Without mandatory collocation rights, competitors would not be able to achieve direct access to incumbent bottleneck facilities, and competitors would be thwarted in their ability to deploy alternative, innovative technologies. Such a result would significantly diminish one of the bedrock principles of the 1996 Act – the promotion of competition to spur infrastructure investment and technological innovation.[13]

8. Through innovative technologies, the market is already bringing customers a broader offering of new services and capabilities. Because these technologies are still relatively nascent, it is likely that the services available in today's market are only a precursor to an even wider array of services that promise to be deployed in the near future. As a result, the types of equipment that competitors seek to collocate in 2001 are dramatically different than the equipment being collocated when the 1996 Act was passed. Similarly, given current trends, it is likely that the changes in the types of equipment required for collocation in 2006 will continue to reflect this unparalleled speed of technological evolution. However, although the types of equipment being deployed have changed since the passage of the 1996 Act, and likely will continue to change, the fundamental purpose for collocation remains the same – to allow competitors direct access to bottleneck facilities in order to provide competitive telecommunications services, including an ever-increasing array of new, advanced services.

9. One of the 1996 Act's core market-opening provisions is section 251(c)(6) of the Communications Act, which requires incumbent LECs "to provide . . . for physical collocation of equipment necessary for interconnection or access to unbundled network elements at the premises of the local exchange carrier."[14] In 1996, in the *Local Competition Order*, the Commission adopted rules to implement section 251(c)(6).[15] These rules addressed, among other

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[13] *See Joint Statement of Managers,* S. Conf. Rep. No. 104-230, 104th Cong. 2d Sess. 1 (1996) (*Joint Explanatory Statement*).

[14] 47 U.S.C. § 251(c)(6). Each incumbent LEC has 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." *Id.* In a physical collocation arrangement, a competitor leases space at an incumbent LEC's premises for its equipment. The competing provider has physical access to this space to install, maintain, and repair its equipment. In a virtual collocation arrangement, the competitor designates the equipment to be placed at the incumbent LEC's premises. The competing provider, however, does not have physical access to the incumbent's premises. Instead, the equipment is under the physical control of the incumbent LEC, and the incumbent is responsible for installing, maintaining, and repairing equipment designated by the competing provider. *Deployment of Wireline Services Offering Advanced Telecommunications Capability*, CC Docket No. 98-147, *Order on Reconsideration and Second Further Notice of Proposed Rulemaking*, 15 FCC Rcd 17806, 17812, para. 9 (2000) (*Collocation Reconsideration Order* or *Second Further Notice*), *petitions for further recon. pending.*

[15] *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, First Report and Order, CC Docket No. 96-98, 11 FCC Rcd 15499, 15782-807, paras. 555-607 (1996) (*Local Competition Order*), *aff'd in part and vacated in part sub nom. Competitive Telecommunications Ass'n v. FCC*, 117 F.3d 1068 (8th Cir. 1997) & *Iowa Util. Bd. v. FCC*, 120 F.3d 753 (8th Cir. 1997), *aff'd in part, rev'd in part, and remanded sub nom. AT&T Corp. v. Iowa Util. Bd.*, 525 U.S. 366 (1999) (*AT&T v. Iowa Util. Bd.*), *aff'd in part and vacated in part on* (continued....)

matters, where competitive LECs could physically collocate equipment, the types of equipment that could be collocated, and how incumbent LECs should allocate space in the event insufficient physical collocation space is available. While the Commission adopted specific and detailed national collocation rules, the Commission concluded that state commissions should have the flexibility to adopt additional collocation requirements that are consistent with the Communications Act and the Commission's implementing rules.[16]

10. Three years later, in the *Advanced Services First Report and Order*, the Commission modified the collocation rules to remove barriers to telecommunications competition, particularly in the nascent advanced services market.[17] These rules require incumbent LECs to expand their collocation offerings to include cageless and shared collocation, among other physical collocation arrangements.[18] Further, when collocation space is exhausted at a particular incumbent LEC location, the incumbent LEC must permit collocation in adjacent controlled environmental vaults or similar structures to the extent technically feasible.[19] The Commission specified, among other requirements, that a collocation method used by one incumbent LEC or mandated by a state commission is presumptively technically feasible for any other incumbent LEC.[20] The Commission specified that these strengthened collocation rules should serve as minimum requirements and continued to recognize that the state commissions may adopt additional collocation requirements.[21]

(Continued from previous page)
remand, Iowa Util. Bd. v. FCC, 219 F.3d 744 (8th Cir. 2000), *cert. granted sub nom. Verizon Communications Corp. v. FCC*, 121 S.Ct. 877 (2001), *Order on Reconsideration*, 11 FCC Rcd 13042 (1996) (*Local Competition First Reconsideration Order*), *Second Order on Reconsideration*, 11 FCC Rcd 19738 (1996) (*Local Competition Second Reconsideration Order*), *Third Order on Reconsideration and Further Notice of Proposed Rulemaking*, 12 FCC Rcd 12460 (1997) (*Local Competition Third Reconsideration Order*), *further recon. pending.*

[16] *Local Competition Order*, 11 FCC Rcd at 15783-84, para. 558.

[17] *Deployment of Wireline Services Offering Advanced Telecommunications Capability*, CC Docket No. 98-147, First Report and Order and Further Notice of Proposed Rulemaking, 14 FCC Rcd 4761, 4773-74, paras. 23-24 (1999) (*Advanced Services First Report and Order*), *aff'd in part, and vacated and remanded in part sub nom. GTE Service Corp. v. FCC*, 205 F.3d 416 (D.C. Cir. 2000) (*GTE v. FCC*), *on recon.*, *Collocation Reconsideration Order*, 15 FCC Rcd at 17806-39, paras. 1-69.

[18] *Advanced Services First Report and Order*, 14 FCC Rcd at 4784-86, paras. 41-43. In a shared physical collocation arrangement, two or more competitive LECs share caged collocation space pursuant to terms and conditions agreed to by the competitive LECs. *Id.* at 4784, para. 41. In a caged physical arrangement, a competitive LEC leases and has direct physical access to caged space at an incumbent LEC structure for its equipment. Cageless physical collocation eliminates the cage surrounding the competitive LEC's equipment. *Id.* at 4784-85, para. 42.

[19] 47 C.F.R. § 51.323(k)(3). In adjacent physical collocation, the competitive LEC's equipment is located within a controlled environmental vault or similar structure that the competitive LEC or its contractor constructs on property leased from the incumbent LEC. *Advanced Services First Report and Order*, 14 FCC Rcd at 4786, para. 44.

[20] *Id.* at 4765, para. 8, & 4786-87, para. 45.

[21] *Id.* at 4773-74, paras. 23-24.

11. In *GTE v. FCC*, the D.C. Circuit affirmed much of the *Advanced Services First Report and Order*, but vacated and remanded for further consideration certain aspects of that Order.[22] Specifically, the court vacated and remanded the requirement that an incumbent LEC permit collocation of any equipment that is "used or useful" for either interconnection or access to unbundled network elements, regardless of the other functionalities inherent in such equipment.[23] The court also vacated and remanded the requirement that incumbent LECs allow competitive LECs to construct cross-connects outside of their immediate physical collocation space.[24] Finally, the court vacated and remanded the *Advanced Services First Report and Order* to the extent it gave requesting carriers the option of selecting physical collocation space from among the unused space within the incumbent LEC's premises, prohibited the incumbent from placing collocators in a room or isolated space separate from the incumbent's own equipment, and precluded the incumbent from requiring competitors to use separate entrances to access their own equipment.[25] The D.C. Circuit found that the remanded rules "diverge[d] from any realistic meaning of the statute, because the Commission ha[d] favored the [incumbent] LECs' competitors in ways that exceed what is 'necessary' to achieve reasonable 'physical collocation' and in ways that may result in unnecessary takings of [incumbent] LEC property."[26]

III. EXECUTIVE SUMMARY

12. We take several actions in this Fourth Report and Order, including:

- We find that equipment is "*necessary* for interconnection or access to unbundled network elements" within the meaning of section 251(c)(6) if an inability to deploy that equipment would, as a practical, economic, or operational matter, preclude the requesting carrier from obtaining interconnection or access to unbundled network elements as contemplated in sections 251(c)(2) and 251(c)(3).

- We find that multifunction equipment meets the "necessary" standard only if the primary purpose and function of the equipment, as the requesting carrier seeks to deploy it, are to provide the requesting carrier with "equal in quality" interconnection or "nondiscriminatory access" to one or more unbundled network elements. We also find that any function that would not meet our equipment

[22] *GTE v. FCC*, 205 F.3d at 420-27.

[23] *Id.* at 422-24.

[24] *Id.* at 423-24.

[25] *Id.* at 424-26.

[26] *Id.* at 421. Following the court's decision in *GTE v. FCC*, the Commission issued a *Second Further Notice* to invite comment on what actions the Commission should take in response to the remand. This Notice invited comment on, among other matters, the definition of "necessary" as used in section 251(c)(6), whether section 251(c)(6) encompasses cross-connects between collocators, and what physical collocation requirements the Commission should adopt to replace those vacated by the court. *Second Further Notice*, 15 FCC Rcd at 17839-49, paras. 71-98.

standard as a stand-alone function must not cause the equipment to significantly increase the burden on the incumbent's property.

- We conclude that switching and routing equipment typically meets our equipment standard because an inability to deploy that equipment would, as a practical, economic, or operational matter, preclude a requesting carrier from obtaining nondiscriminatory access to an unbundled network element, the local loop. As a general matter, an incumbent LEC therefore must allow requesting carriers to collocate switching and routing equipment. An incumbent LEC, however, generally need not allow collocation of traditional circuit switches, which are very large pieces of equipment compared to newer, more advanced switching and routing equipment. We find, in light of the practical, economic, and operational availability of the relatively small switches and routers, that traditional circuit switches generally do not meet our equipment standard.

- We eliminate the Commission's previous requirement, adopted pursuant to section 251(c)(6), that an incumbent LEC allow competitive LECs to construct and maintain cross-connects outside of their immediate physical collocation space at the incumbent's premises. We find, however, that sections 201 and 251(c)(6) authorize us to require that an incumbent LEC provision cross-connects between collocated carriers, and we require that an incumbent LEC provide such cross-connects upon reasonable request.

- We eliminate rules that gave carriers requesting physical collocation the option of picking their physical collocation space from among the unused space in an incumbent LEC's premises, that precluded an incumbent LEC from restricting physical collocation to space separated from space housing the incumbent's equipment, and that precluded an incumbent from requiring the construction and use of a separate entrance to access physical collocation space. In their place, we establish principles to ensure that the incumbent LEC's policies and practices in assigning and configuring physical collocation space are consistent with the statutory requirement that the incumbent provide for physical collocation "on rates, terms, and conditions that are just, reasonable, and nondiscriminatory."[27]

[27] The D.C. Circuit affirmed some of the rules adopted in the *Advanced Services First Report and Order*. The court upheld rules requiring incumbent LECs to expand their collocation offerings to include cageless and adjacent collocation, and to allocate the costs of preparing space for collocation among potential collocators, as well as the rule precluding incumbent LECs from imposing unreasonable minimum space requirements on collocators. *See GTE v. FCC*, 205 F.3d at 420-27. This Order does not address or change in any way those collocation rules that the court upheld. Nor does it change the Commission's policy of encouraging the states to take an active role in resolving collocation disputes.

IV. DISCUSSION

A. Overview

13. On remand, we reinterpret section 251(c)(6) in light of the D.C. Circuit's opinion. In the first section below, we interpret the term "necessary" as used in section 251(c)(6) by determining that equipment is eligible for collocation only if an inability to deploy that equipment would, as a practical, economic, or operational matter, preclude the requesting carrier from obtaining interconnection or access to unbundled network elements as contemplated in sections 251(c)(2) and 251(c)(3). In the second section below, we adopt a revised cross-connect rule that minimizes the intrusion into the incumbent LEC's property interests but promotes Congress' overall statutory purpose in fostering competition and technological innovation.[28] In the final section, we conclude that an incumbent LEC should have ultimate authority over assigning and configuring space within its premises, albeit with specific limitations that curtail its ability to use this authority in an anti-competitive manner.

14. We adopt these rule amendments to more appropriately implement the balances reflected in the statute, between promoting competition and technological innovation in all telecommunications markets, and establishing limits on the scope of the intrusion allowed into the incumbent LEC's property rights to avoid unnecessary takings of such property. Nonetheless, through these amended rules, we reaffirm our commitment to ensuring that facilities-based competitors have the incentive and ability to invest in alternative infrastructure and innovative technologies, while, at the same time, ensuring that incumbents retain similar incentives and capabilities.

B. "Necessary" Equipment under Section 251(c)(6)

1. Background

15. Section 251(c)(6) of the Communications Act requires incumbent LECs to permit collocation of equipment "necessary for interconnection or access to unbundled network elements."[29] In the *Local Competition Order*, the Commission interpreted section 251(c)(6) as requiring incumbent LECs to permit competitors to collocate equipment that is "used" or "useful" for either interconnection or access to unbundled network elements.[30] Consistent with this interpretation, the Commission concluded that competitive LECs may collocate transmission

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[28] We note that the statutory purpose of promoting competition, investment, and innovation is furthered through actions that enable both incumbent LECs and their competitors to compete in the provision of telecommunications services or to provide more innovative telecommunications services. In promoting these interests, we recognize that we must adopt rules that enable competition, investment, and innovation in furtherance of the public's interest, not rules that merely favor one type of competitor over another. *See generally* Disney Comments at 3 (suggesting that the collocation rules should encourage deployment of as many broadband networks as possibly, as quickly as possible, in a competitive environment).

[29] 47 U.S.C. § 251(c)(6).

[30] *Local Competition Order*, 11 FCC Rcd at 15794-96, paras. 579-81.

equipment, including optical terminating equipment and multiplexers, at incumbent LEC premises.[31] The Commission also concluded that section 251(c)(6) does not require that an incumbent LEC permit the collocation of switching equipment or equipment used to provide enhanced services.[32] The Commission recognized, however, that technological developments were tending to blur the line between multiplexing and switching, and indicated that it would reexamine the meaning of section 251(c)(6) if such action would further the 1996 Act's procompetitive goals.[33]

16. In the *Advanced Services First Report and Order*, the Commission did in fact reexamine the meaning of section 251(c)(6) and determined that it should be interpreted as requiring incumbent LECs to allow collocation of any equipment that is "used or useful" for either interconnection or access to unbundled network elements, regardless of whether such equipment includes a switching functionality, provides enhanced services capabilities, or offers other functionalities.[34] The Commission required incumbent LECs to permit collocation of such equipment as digital subscriber line access multiplexers (DSLAMs), routers, asynchronous transfer mode (ATM) multiplexers, and remote switching modules.[35] The Commission also concluded that an incumbent LEC must not limit a competitor's ability to use all the features, functions, and capabilities of collocated equipment, including, but not limited to, switching and routing features and functions.[36]

17. In *GTE v. FCC*, the D.C. Circuit determined that the Commission's interpretation of "necessary" under section 251(c)(6) "seem[ed] overly broad and disconnected from [that provision's] statutory purpose."[37] The court held that "a statutory reference to 'necessary' must be construed in a fashion that is consistent with the ordinary and fair meaning of the word, *i.e.*, so as to limit 'necessary' to that which is required to achieve a desired goal."[38] The court was particularly concerned that the Commission's construction "diverge[d] from any realistic meaning of the statute, because the Commission [had] favored the [incumbent] LEC's competitors in ways that exceed what is 'necessary' to achieve reasonable 'physical collocation' and in ways that may result in unnecessary takings of [incumbent] LEC property."[39] Concluding that the Commission's construction of "necessary" in section 251(c)(6) failed to meet the

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[31] *Id.* at 15794, para. 580.

[32] *Id.* at 15794, para. 581.

[33] *Id.*

[34] *Advanced Services First Report and Order*, 14 FCC Rcd at 4776-77, para. 28.

[35] *Id.*

[36] *Id.*

[37] *GTE v. FCC*, 205 F.3d at 422.

[38] *Id.* at 423.

[39] *Id.* at 421.

statutory standard, the court vacated and remanded the *Advanced Services First Report and Order* to the extent it required that an incumbent LEC permit physical collocation of equipment that is not "directly related to and thus necessary, required, or indispensable to 'interconnection or access to unbundled network elements.'"[40] The court made clear, however, that the Commission could construe "necessary" differently on remand as long as the Commission's construction stayed "within the limits of 'the ordinary and fair meaning" of section 251(c)(6).[41]

2. Meaning of "Necessary"

18. To determine the meaning of "necessary" as used in section 251(c)(6), we look first to the text of the statute. Section 251(c)(6) requires incumbent LECs to provide for "collocation of equipment necessary for interconnection or access to unbundled network elements at the premises of the local exchange carrier . . . ."[42] We agree with the D.C. Circuit and many of the commenters that "any search for [the] 'plain meaning'" of "necessary" as used in this provision "is fruitless."[43] As the D.C. Circuit's opinion implicitly recognizes, "necessary" has varying degrees.[44] Neither the statutory language nor the legislative history reveals the degree of necessity that Congress intended to require in enacting section 251(c)(6).[45] We therefore look to the broader statutory scheme and the underlying policy goals to determine the

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[40] *Id.* at 424.

[41] *Id.* (quoting *AT&T v. Iowa Util. Bd.*, 525 U.S. at 390).

[42] 47 U.S.C. § 251(c)(6).

[43] *See, e.g.*, AT&T Comments at 9; Disney Comments at 5; Joint Commenters Comments at 18-19; Rhythms Comments at 3; *see also AT&T v. Iowa Utilities Bd.*, 525 U.S. at 397 (stating that the 1996 Act is "not a model of clarity").

[44] *GTE v. FCC*, 205 F.3d at 423; *accord McCulloch v. Maryland*, 4 Wheat. 316, 414 (1819) (Marshall, C.J.) ("The word 'necessary' . . . has not a fixed character, peculiar to itself. . . . A thing may be necessary, very necessary, absolutely or indispensably necessary."); *Milligan v. City of Red Oak, Iowa*, 230 F.3d 355, 359 (8th Cir. 2000) (*per curiam*) (under Iowa law, the test for determining whether a taking is "necessary" is whether the condemning authority can reasonably expect to achieve its public purpose); *Montana Power Co. v. Burlington Northern R.R. Co.*, 900 P.2d 888, 891 (Mont. 1995) ("necessary" means "reasonable, requisite, and proper for the accomplishment of the end in view"); *see also MCI Telecommunications Corp. v. American Telephone and Telegraph Co.*, 512 U.S. 218, 226 (1994) ("required" can mean either "demanded as essential" or "demanded as appropriate") (internal quotation marks omitted).

[45] The legislative history makes clear that Congress intended to provide explicit statutory authorization for physical collocation, but does not define "necessary" or otherwise directly address what equipment an incumbent LEC must allow a requesting carrier to collocate. *See, e.g., Joint Explanatory Statement*, *supra* note 13, at 117-28; H. Rep. No. 104-204(1), 104th Cong., 1st Sess., 4 & 73 (1995) (*1995 House Report*); S. Rep. No. 104-23, 104th Cong., 1st Sess., 19-22 & 92 (1995) (*1995 Senate Report*); *compare Bell Atlantic Telephone Cos. v. FCC*, 24 F.3d 1441 (D.C. Cir. 1994) (*Bell Atlantic I*) (holding that the Communications Act of 1934 did not authorize the Commission to require LECs to permit physical collocation of their property) *with* 140 Cong. Rec. H5216, 5230 (June 28, 1994) (statements of Rep. Markey) (stating 18 days after the decision in *Bell Atlantic I* that without an explicit physical collocation provision, the Commission will "lack[] the tools needed to pave a high quality and affordable information superhighway").

meaning of "necessary" as used in section 251(c)(6).[46] As the court directed, however, any meaning we ascribe to that term must be "consistent with the ordinary and fair meaning of the word, *i.e.*, so as to limit 'necessary' to that which is required to achieve a desired goal."[47]

19. Section 251 establishes a list of requirements that apply to various types of telecommunications carriers. Section 251(c) sets out those that apply to incumbent LECs. Sections 251(c)(2) and 251(c)(3), in particular, impose interconnection and unbundled network element obligations on incumbent LECs. In addition, section 251(d)(2)(A) of the Act requires that, in determining which network elements should be unbundled under section 251(c)(3), the Commission must consider whether "access to such network elements as are proprietary in nature is *necessary*."[48] Because sections 251(c)(6) and 251(d)(2)(A) both use the same term, "necessary," in reference to the same concept, "access to [unbundled] network elements," we believe it reasonable to interpret "necessary" in the two provisions similarly.

20. The similarity of purpose behind sections 251(c)(6) and 251(d)(2)(A) supports this view of "necessary." These provisions grant competitors certain interconnection, unbundled access, and collocation rights in order to promote the public interests in competition and technological innovation. But as the Supreme Court determined with regard to unbundled network elements and the D.C. Circuit determined with regard to collocation, those rights are not unlimited.[49] Instead, we believe it reasonable to conclude that Congress used the term "necessary" in both provisions to balance two important, but potentially competing purposes. On the one hand, both provisions seek to promote competition and innovation through the grant of collocation rights and the right to access unbundled network elements. On the other hand, both provisions seek to protect an incumbent LEC's legitimate property interests against *unwarranted* intrusion: in the case of section 251(d)(2)(A), the property is intellectual property; in the case of section 251(c)(6), it is real property.

21. Because of the similarities in statutory language and purpose, we believe it is reasonable to conclude that "necessary" in sections 251(c)(6) and 251(d)(2)(A) balances public and private interests in much the same manner. We therefore also conclude that our standard for determining which equipment is "necessary" within the meaning of section 251(c)(6) should be similar to our standard for determining which proprietary network elements are "necessary" within the meaning of section 251(d)(2)(A).[50] In the *UNE Remand Order*, we concluded that a

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[46] *See Bell Atlantic Tel. Cos. v. FCC*, 131 F.3d 1044, 1047 (D.C. Cir. 1997) (*Bell Atlantic II*); *Advanced Services Order*, 13 FCC Rcd 24045, para. 71; CTSI Comments at 7 (to properly interpret section 251(c)(6), the Commission should read statute in its entirety and in light of Congress' objectives).

[47] *GTE v. FCC*, 205 F.3d at 423; *see AT&T v. Iowa Util. Bd.*, 525 U.S. at 388 (in determining the meaning of "necessary" under section 251(d)(2)(A), the Commission must "apply some limiting standard, rationally related to the goals of the Act").

[48] 47 U.S.C. § 251(d)(2)(A) (emphasis added).

[49] *AT&T v. Iowa Util. Bd.*, 525 U.S. at 388; *GTE v. FCC*, 205 F.3d at 423.

[50] *See* Cisco Comments at 5-6; Supra Comments at 11; *see also* GSA Comments at 5-6 (arguing that a definition of "necessary" in section 251(c)(6) similar to that adopted for section 251(d)(2)(A) would appropriately ensure that (continued....)

proprietary network element is "necessary" within the meaning of section 251(d)(2)(A) if "lack of access to that element would, as a practical, economic, and operational matter, *preclude* a requesting carrier from providing the services it seeks to offer."[51] Similarly, as we explain in more detail below, we now conclude that equipment is "necessary" for interconnection or access to unbundled network elements within the meaning of section 251(c)(6) if an inability to deploy that equipment would, as a practical, economic, or operational matter, preclude the requesting carrier from obtaining interconnection or access to unbundled network elements.[52] As we also explain below, we conclude, in addition, that the scope of these collocation obligations are co-extensive with the interconnection and unbundled access obligations contained in sections 251(c)(2) and 251(c)(3).[53]

22. In applying this equipment standard where multiple equipment options exist to provide interconnection or access to an unbundled network element, the parties must take into account the relative burdens that deployment of the different options would place on the incumbent LEC's property interests. Specifically, the record indicates that most telecommunications equipment will be available from multiple manufacturers, often in many different models.[54] Where the different options of "necessary" equipment impose roughly comparable demands on the incumbent's space and other resources, our standard allows the requesting carrier to choose which particular option to deploy.

23. In some circumstances, however, implementing a particular equipment option might increase the overall demand on the incumbent's resources so significantly as to require the requesting carrier to choose a different option. For instance, extremely large equipment might require that the incumbent provide the requesting carrier with more total physical collocation space than would be required if other equipment were deployed. Similarly, extremely heavy equipment might require that the incumbent provide floor support beyond that typically available in the incumbent's premises. An incumbent also might have to upgrade otherwise sufficient power, air conditioning, heating, or similar plant in order to accommodate equipment that places unusually great demands on that infrastructure. We believe that a requesting carrier should not be considered practically, economically, or operationally precluded by an inability to deploy a particular piece of equipment, if deployment of that particular equipment would burden an

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a competitive LEC will not be required to implement impractical solutions, employ uneconomic network configurations, or breach reasonable operational constraints).

[51] *Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, Third Report and Order and Fourth Further Notice of Proposed Rulemaking, 15 FCC Rcd 3696, 3721, at para. 44 (1999) (emphasis in original & subsequent history omitted) (*UNE Remand Order*).

[52] *See* part IV.B.5, *infra* (addressing switching and routing equipment).

[53] *See* part IV.B.3, *infra*.

[54] *See, e.g.*, Rhythms Comments at 13; Letter from Scott P. Anderson, Manager, Regulatory Affairs & Industry Relations, Broadslate Networks, to Magalie Roman Salas, Secretary, FCC, at 3-9 (filed Mar. 14, 2001) (*Broadslate Mar. 14, 2001 Letter*).

incumbent's property interests, *and* alternative equipment not imposing such a burden were practically, economically, and operationally available to obtain interconnection or access to unbundled network elements, as described above.

24. We reject any suggestion that we must or should adopt a definition of "necessary" significantly different from that adopted with respect to section 251(d)(2)(A). We find that most of the alternative approaches proposed in the record either provide little additional guidance beyond the actual statutory language or do not provide an adequate limiting principle, as required by the D.C. Circuit's remand. For example, some of the suggested definitions fall outside the ordinary and fair meaning of "necessary" and therefore are inconsistent with the statute and the court's remand.[55] Other proposed definitions substitute equally vague synonyms for an already ambiguous statutory term.[56] Finally, some proposed definitions classify equipment as "necessary" on bases that appear unrelated to the statutory standard. For instance, certain competitive LECs appear to be equating the term "necessary" with any equipment that an incumbent deploys in its premises, regardless of its function.[57] We find these proposals inconsistent with both the language and purposes of section 251(c)(6).[58]

25. We also reject the argument, advanced by some incumbent LECs and competitive LECs, that we should interpret "necessary" as modifying "physical collocation," rather than "equipment" in section 251(c)(6).[59] Such a reading would wrongly place our focus on whether "collocation" of the equipment is necessary for interconnection and access to unbundled network elements as opposed to whether the equipment itself, regardless of its location in the network, is

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[55] *See, e.g.*, DSLnet Comments at 31 (arguing that any commercially available equipment that enables interconnection or access to unbundled network elements meets the "necessary" standard); Intraspan Comments at 7 (proposing that the marketplace should determine which equipment is "necessary"); NAS Comments at 2-6 (urging readoption of the "used or useful" standard).

[56] *See, e.g.*, Conectiv Comments at iii; Telergy Comments at 3; SBC Comments at 14; Verizon Comments at 4-5.

[57] *See, e.g.*, Corecomm Comments at 20; CTSI Comments at 6; Supra Comments at 10. An incumbent LEC, however, may use its premises for activities other than interconnecting or accessing the different parts of its network. The equipment an incumbent deploys within its premises therefore bears no intrinsic relationship to "equipment necessary for interconnection or access to unbundled network elements" in section 251(c)(6). *See* SBC Reply at 10-11; Verizon Reply at 6-8. Similarly, authorizing the collocation of any telecommunications-related equipment whose deployment would facilitate a competitive LEC's ability to compete, as Focal proposes, would give requesting carriers virtually unlimited access to an incumbent's property irrespective of any relationship between the equipment sought to be collocated and the collocator's ability to interconnect and access unbundled network elements. *See* Focal Comments at 3.

[58] *See* SBC Reply at 5-10.

[59] *See, e.g.*, Joint Commenters Comments at 20-23; Qwest Comments at 3-4; Verizon Comments at 2-3; *see also* Comptel Comments at 4 (arguing that the Commission should focus on whether collocating equipment having a particular function makes the competitive LEC materially more efficient than if the function were provided from elsewhere). *But see* Telergy Comments at 14 (pointing out that collocation is not absolutely required for interconnection or access to unbundled network elements because alternatives, such a meet-point interconnection, are available); ATG Reply at 4 (same).

necessary for interconnection and access to unbundled network elements.[60] Section 251(c)(6), instead, provides "for *physical collocation of equipment necessary* for interconnection or access to unbundled network elements at the premises of the local exchange carrier . . . ."[61] We find that the most natural reading of this statutory language is that "necessary" modifies "equipment." Under this reading, we find that simple grammar dictates that the term "necessary" modifies "equipment" not "physical collocation," which appears earlier in the statutory text.

26. We find, moreover, that this natural reading is consistent with the overall structure of section 251(c)(6). In addition to requiring physical collocation, section 251(c)(6) states that an incumbent LEC "may provide for virtual collocation if . . . physical collocation is not practical for technical reasons or because of space limitations."[62] Interpreting section 251(c)(6) as providing for the collocation of "necessary" equipment accords virtual collocation a logical role in the statutory scheme.[63] Specifically, under this interpretation, the incumbent LEC would have to allow collocation of any "necessary" equipment. This collocation normally would be physical; but where physical collocation is impractical, the incumbent could provide for virtual collocation.[64] In contrast, determining that "necessary" modifies "physical collocation" would result in a seemingly self-contradictory statute. Under that interpretation, section 251(c)(6) would provide for "physical collocation" whenever the "necessary" test is met, giving the option for virtual collocation no independent meaning.[65]

3. Relationship with Sections 251(c)(2) and 251(c)(3)

27. Having defined the term "necessary," we also must determine the scope of activities for which competitors are entitled to collocate. The specific statutory purpose for which an incumbent LEC's competitors may collocate "necessary" equipment is for "interconnection or access to unbundled network elements."[66] Several parties argue that "interconnection" as used in section 251(c)(6) refers to "interconnection" as used in section

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[60] Letter from Frank S. Simone, Government Affairs Director, AT&T, to Magalie Roman Salas, Secretary, FCC, at Att., p. 7 (filed Apr. 5, 2001) (*AT&T Apr. 5, 2001 Letter*) (stating that the plain terms of section 251(c)(6) focus not on whether equipment needs to be collocated. but simply on whether it is needed, broadly speaking, for interconnection or access to unbundled network elements).

[61] 47 U.S.C. § 251(c)(6) (emphasis added).

[62] *Id.*

[63] Section 251(c)(6) provides for "virtual collocation if the [incumbent] local exchange carrier demonstrates to the State commission that physical collocation is not practical for technical reasons or because of space limitations." 47 U.S.C. § 251(c)(6).

[64] In note 14, *supra*, we define physical and virtual collocation.

[65] *See, e.g., 1995 House Report, supra* note 45, at 73 (stating that the "risk of discriminatory interconnection grows the farther one gets away from the central office" and that "for this reason, the legislation mandates actual, or physical, collocation," except where physical collocation is impractical).

[66] 47 U.S.C. § 251(c)(6).

251(c)(2) and "access to unbundled network as used in section 251(c)(6) refers to "access to network elements on an unbundled basis" as used in section 251(c)(3).[67] We agree with these arguments. Because section 251(c), by its terms, applies only to incumbent LECs and because section 251(c)(6) references the same obligations – using virtually identical language – detailed in sections 251(c)(2) and 251(c)(3), we conclude that the most reasonable interpretation of the collocation obligations in section 251(c)(6) is that they are coextensive with the requirements of sections 251(c)(2) and 251(c)(3).[68] Accordingly, we find that section 251(c)(6) encompasses the scope of the interconnection and network access obligations imposed in sections 251(c)(2) and 251(c)(3).[69]

28. The Communications Act and the Commission's prior orders define the scope of the interconnection and network access obligations imposed in sections 251(c)(2) and 251(c)(3). Section 251(c)(2) requires each incumbent LEC "to provide, for the facilities and equipment of any requesting telecommunications carrier, interconnection with the [incumbent LEC's] network . . . for the transmission and routing of telephone exchange service and exchange access . . . at any technically feasible point within the [incumbent's] network."[70] This interconnection must be "at least equal in quality to that provided by the [incumbent] to itself or to any subsidiary, affiliate, or any other party to which the [incumbent] provides interconnection; and . . . on rates, terms, and conditions that are just, reasonable, and nondiscriminatory . . . ."[71] Section 251(c)(3) requires each incumbent LEC "to provide to any requesting telecommunications carrier for the provision of a telecommunications service, nondiscriminatory access to network elements on an unbundled basis at any technically feasible point on rates, terms, and conditions that are just, reasonable, and nondiscriminatory . . . ."[72] The Commission has required that an incumbent LEC must provide requesting carriers with nondiscriminatory access to all the features, functions, and capabilities of an unbundled network element.[73]

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[67] *See, e.g.*, AT&T Comments at 11-13; Joint Commenters Reply at 8-9; RCN Comments at 7; Telergy Comments at 16-17; Focal Reply at 9; *see also Bell Atlantic II*, 131 F.3d at 1047 (stating that "[c]ontext serves an especially important role in textual analysis of a statute when Congress has not expressed itself as unequivocally as might be wished"). *But see* SBC Reply at 7-9 (arguing, in effect, that an incumbent need not allow collocation of equipment "necessary" to achieve interconnection equal in quality to that which the incumbent provides itself or to access all the features, functions, and capabilities of an unbundled network element).

[68] *See WorldCom, Inc. v. FCC*, 246 F.3d 690, 694 (D.C. Cir. 2001) (noting relationship between collocation obligations and obligations under sections 251(c)(2) and 251(c)(3)); Corecomm Comments at 13; RCN Comments at 7.

[69] *E.g.*, RCN Comments at 7; Joint Commenters Reply at 8-9;

[70] 47 U.S.C. § 251(c)(2).

[71] 47 U.S.C. § 251(c)(2)(C)-(D).

[72] 47 U.S.C. § 251(c)(3).

[73] 47 C.F.R. § 51.307(c); *see, e.g., UNE Remand Order*, 15 FCC Rcd at 3772-73, para. 167 (defining an unbundled local loop as including all the features, functions, and capabilities of the transmission facilities between an incumbent LEC's central office and the loop demarcation point at the customer premises); *see also* DSLnet (continued....)

29. Whether equipment is "necessary for interconnection" within the meaning of section 251(c)(6) logically depends on the equipment's effect on the requesting carrier's ability to obtain interconnection "equal" to that which the incumbent provides itself or others within the meaning of section 251(c)(2).[74] Similarly, whether equipment is "necessary for . . . access to unbundled network elements" within the meaning of section 251(c)(6) logically depends on the equipment's effect on the requesting carrier's ability to obtain "nondiscriminatory access" to unbundled network elements within the meaning of section 251(c)(3).[75] Otherwise, collocated equipment would provide interconnection and access different from (*i.e.*, either inferior or superior to) the quality provided for in sections 251(c)(2) and 251(c)(3).[76] We therefore conclude that section 251(c)(6) allows a requesting carrier to collocate any equipment necessary for obtaining equal interconnection or nondiscriminatory access to unbundled network elements as contemplated in sections 251(c)(2) and 251(c)(3).

30. In the *Local Competition Order*, the Commission concluded that the "equal in quality" standard in section 251(c)(2) requires that an incumbent LEC design interconnection facilities to meet the same technical criteria and service standards, including transmission standards, that are used within the incumbent's own network.[77] Accordingly, applying the statutory standard set forth in section 251(c)(2), we conclude that section 251(c)(6) allows the interconnecting carrier to collocate any equipment necessary for interconnecting with the incumbent LEC at a level equal in quality to that which the incumbent obtains within its own network or the incumbent provides to any affiliate, subsidiary, or other party.[78]

31. Similarly, as the Supreme Court held in *AT&T v. Iowa Util. Bd.*, a "network element" need not "be part of the physical facilities or equipment that an incumbent uses to provide local phone service."[79] Rather, that statutory term includes, in addition to such facilities or equipment, the "features, functions, and capabilities" provided by such facilities or equipment.[80] Therefore, in order to obtain "nondiscriminatory access" to an unbundled network

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Comments at 28-29 (arguing that a requesting carrier must be able to employ equipment that can interact with the features, functions, and capabilities of unbundled network elements).

[74] *E.g.*, AT&T Comments at 13; Joint Commenters Comments at 24-26; RCN Comments at 7.

[75] *E.g.*, DSLnet Comments at 28; Telergy Comments at 3.

[76] *See, e.g.*, AT&T Comments at 12; Joint Commenters Comments at 24-26; RCN Comments at 7.

[77] *Local Competition Order*, 11 FCC Rcd at 15614-15, para. 224; *cf. Iowa Util. Bd. v. FCC*, 219 F.3d at 757 (finding it "self-evident that the Act prevents an [incumbent LEC] from discriminating between itself and a requesting competitor with respect to the quality of the interconnection provided").

[78] *See* Cisco Comments at 9 (in the context of modern technology, quality of service functions are critical to an ability to interconnect); *WorldCom Mar. 23, 2001 Letter*, *supra* note 7, at 2 (interconnection encompasses the ability to move traffic intelligently from point to point). Thus, for instance, if a link in the incumbent's network is able to accommodate traffic with a particular throughput rate and quality of service, a carrier that requests and pays for a similar link must have the opportunity to transmit traffic through the interconnection with the same throughput rate and quality of service. *See generally* AT&T Comments at Att. 2 (Frontera Declaration), pp. 9-13.

element within the meaning of section 251(c)(3), a carrier must be able to obtain more than mere access to the physical facilities and equipment included within the element.[81] The carrier must instead be able to access all of the features, functions, and capabilities provided by means of the facilities and equipment.[82] We therefore reject SBC's position that requiring access to an element's features, functions, and capabilities expands the meaning of "access" beyond statutory limits.[83] Instead, such a requirement properly recognizes that the statutory definition of "network element," as interpreted by the Supreme Court, includes, in addition to "a facility or equipment used in the provision of a telecommunications service," the "features, functions, and capabilities" provided by such facility or equipment.[84] Because the incumbent is able to access these features, functions, and capabilities, the nondiscrimination requirement in section 251(c)(3) mandates that the requesting carrier also be able to achieve similar access. Therefore, applying the statutory standard set forth in section 251(c)(3), we further conclude that section 251(c)(6) allows a requesting carrier to collocate any equipment necessary for obtaining "nondiscriminatory access" to an unbundled network element, including any of its features, functions, or capabilities.[85]

4. Multi-functional Equipment

32. Our standard for determining whether equipment is necessary requires that, absent deployment of the equipment, the requesting carrier would, as a practical, economic, or operational matter, be precluded from obtaining "equal in quality" interconnection or "nondiscriminatory access" to unbundled network elements from an incumbent LEC. Because the D.C. Circuit was particularly troubled by the Commission's previous analysis of multi-functional equipment, we find it appropriate to elaborate on how this standard applies to this equipment, which we define as equipment that combines functions that meet our equipment

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[79] *See AT&T v. Iowa Util. Bd.*, 525 U.S. at 387.

[80] 47 U.S.C. § 153(29); *see AT&T v. Iowa Util. Bd.*, 525 U.S. at 387 (holding that vertical switching features, such as call forwarding and call waiting, are functions that that "fall squarely within the statutory definition" of network element).

[81] *See* Telergy Comments at 16-17; AT&T Reply at 12; *AT&T Apr. 5, 2001 Letter*, *supra* note 60, at Att., pp. 4-5.

[82] *See, e.g.*, @link Comments at 20 (arguing that access to the features, functions, and capabilities of a unbundled network element is part of access to the unbundled network element); Conectiv Comments at 9 (maintaining that in order to access unbundled network elements effectively and on the same basis as incumbents, competitive LECs must deploy equipment fully capable of interacting with the elements' features, functions, and capabilities); DSLnet Comments at 28-29; AT&T Reply at 12.

[83] *See* SBC Reply at 7.

[84] 47 U.S.C. § 153(29); *see generally AT&T v. Iowa Util. Bd.*, 525 U.S. at 387.

[85] *See, e.g.*, AT&T Comments at 12; Telergy Comments at 3-4 (for access to an unbundled network element to be meaningful, a requesting carrier must be able to take advantage of all the element's feature, functions, and capabilities); *AT&T Apr. 5, 2001 Letter*, *supra* note 60, at Att., p. 5; Letter from Cristin L. Flynn, Associate Policy Counsel, Internet/Data Law & Policy, WorldCom, to Magalie Roman Salas, Secretary, FCC, at Att., p. 5 (filed Mar. 12, 2001) (*WorldCom Mar. 12, 2001 Letter*).

standard with functions that would not meet that standard as stand-alone functions.[86] As the D.C. Circuit recognized, requiring that an incumbent LEC allow collocation of all multi-functional equipment regardless of the "unnecessary" functions that the equipment may be able to perform might unnecessarily take incumbent LEC property.[87] On the other hand, precluding collocation of equipment that provides even a single "unnecessary" function regardless of the "necessary" functions the equipment would perform, as a practical, economic, or operational matter, might relegate collocators to outmoded and inadequate technology in contravention of the procompetitive and innovation-enhancing statutory purposes.[88]

33. The incumbent LECs deploy multi-functional equipment throughout their networks and thus are able to realize the productivity increases that developments in micro-processing, optical transmission, and other technologies offer.[89] We agree with several parties that the incumbent's competitors also must be able to realize these same benefits in order to further Congress' vision of a fully competitive telecommunications marketplace.[90] In addition, we conclude that allowing the collocation of multi-functional equipment is critical to the realization of Congress' goal of promoting competition and technological innovation. Specifically, multi-functional equipment is designed to enable telecommunications carriers, both incumbents and their competitors, to offer their customers an ever-increasing array of telecommunications services, including advanced services, with ever-increasing efficiency.[91]

34. We find that in certain circumstances collocation of multi-functional equipment is consistent with the statutory language and purposes. In doing so, we agree with Qwest and other commenters that one of the D.C. Circuit's principal concerns with respect to the Commission's prior equipment rule was its failure to establish any standard limiting the functions that a competitor could include in collocated multi-functional equipment.[92] The court, however, did not

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[86] For convenience, we refer to these functions as "necessary" functions and "additional" functions.

[87] *GTE v. FCC*, 205 F.3d at 421; *see* SBC Comments at 12; Letter from Priscilla Hill-Ardoin, Senior Vice-President, SBC, to Magalie Roman Salas, Secretary, FCC, at Att. (filed May 23, 2001) (*SBC May 23, 2001 Letter*).

[88] *E.g.*, Joint Commenters Comments at 21; Supra Comments at 10.

[89] Letter from Teresa Marrero, Senior Attorney, AT&T, to Magalie Roman Salas, Secretary, FCC, at 4 (filed Feb. 21, 2001) (*AT&T Feb. 21, 2001 Letter*); *WorldCom Mar. 23, 2001 Letter*, *supra* note 7, at 5.

[90] *See, e.g.*, ATG Comments at 2 (precluding collocation and use of multi-functional equipment would severely hinder the emergence of telecommunications competition); Rhythms Comments at 16-18; Joint Commenters Reply at 12-13; Network Telephone Reply at 4 (Congress did not intend to deny competitive providers the benefits of efficient, technologically advanced equipment); *WorldCom Mar. 23, 2001 Letter*, *supra* note 7, at 2 (competitive LECs that cannot collocate multi-functional equipment will be about as useful as telephone switch operators – unable to compete in today's marketplace).

[91] *See, e.g.*, Rhythms Comments at 13-15; Tachion Comments at 2-3.

[92] *GTE v. FCC*, 205 F.3d at 423; *see, e.g.*, Telergy Comments at 16; RCN Comments at ii; Rhythms Comments at 4-5; Qwest Reply at 2-3.

foreclose a rule allowing collocation of at least some multi-functional equipment, provided the rule is consistent with the statutory language and purposes.[93]

35. On remand, we adopt an approach for multi-functional equipment similar to that suggested by Qwest and generally supported by several other commenters.[94] In this regard, we believe it is important to point out that Qwest is both an incumbent LEC and a competitive LEC. As Qwest itself emphasizes, it is thus:

> [B]oth a major purchaser and provider of collocation. Accordingly, Qwest is in the unique position of having to balance the need and desire of a [competitive LEC] for collocation space for its own uses with the totally lawful desire of an incumbent LEC to make use of its own private property for its own uses.[95]

Because we believe these to be factors about which the court expressed concern, we find Qwest's comments particularly persuasive.

36. We conclude that the best way to address the court's concerns regarding multi-functional equipment is to require an incumbent LEC to allow collocation of that equipment, if the primary purpose and function of the equipment, as the requesting carrier seeks to deploy it, are to provide the requesting carrier with "equal in quality" interconnection or "nondiscriminatory access" to one or more unbundled network elements.[96] This condition is a direct application of the standard we adopt above for determining whether equipment is necessary within the meaning of section 251(c)(6). This condition recognizes the critical relationship between the equipment sought to be collocated and the specific interconnection or unbundled network elements the requesting carrier seeks from the incumbent LEC.[97] It will ensure that a requesting carrier will not include a "necessary" function in equipment solely as a pretext for assuring its collocation.

37. In applying this condition, the parties must consider the extent to which the particular equipment, as the requesting carrier seeks to deploy it, would perform functions that are practically, economically, or operationally necessary for that carrier to obtain "equal in

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[93] *See GTE v. FCC*, 205 F.3d at 423-24; Qwest Reply at 2-3; Letter from Frank S. Simone, Government Affairs Director, AT&T, to Magalie Roman Salas, Secretary, FCC, at 1 (filed Apr. 20, 2001) (*AT&T Apr. 20, 2001 Letter*). *But see* SBC Comments at 10-14 (arguing that court has determined that the Commission cannot under any circumstances require that an incumbent permit collocation of multi-functional equipment); Verizon Comments at 6-8.

[94] Qwest Comments at 3-4; *see, e.g.*, Rhythms Reply at 2-3; Joint Commenters Reply at 5-6; Letter from Robert B. McKenna, Associate General Counsel, Qwest, to Magalie Roman Salas, Secretary, FCC, at Att., p.1 (filed Mar. 5, 2001) (*Mpower and Qwest Mar. 5, 2001 Letter*); *WorldCom Mar. 23, 2001 Letter*, *supra* note 7, at 3.

[95] Qwest Comments at iii.

[96] *See* Qwest Comments at 5; Gluon Comments at 4; *WorldCom Mar. 23, 2001 Letter*, *supra* note 7, at 3.

[97] *See* paras. 28-29, *supra*.

quality" interconnection or "nondiscriminatory access" to one or more unbundled network elements, as opposed to functions that would not meet our equipment standard as stand-alone functions. In this regard, we agree with Qwest that the requesting carrier must be intending to utilize the equipment primarily to obtain "equal in quality" interconnection or "nondiscriminatory access" to one or more unbundled network elements.[98] We also find that, for purposes of determining whether a piece of equipment is to be utilized primarily to obtain "equal in quality" interconnection or "nondiscriminatory access" to one or more unbundled network elements, there must be a logical nexus between the additional functions the equipment would perform and the telecommunication services the requesting carrier seeks to provide to its customers by means of the interconnection or unbundled network element.[99] For instance, if a requesting carrier seeks to provide customers with telephone exchange service and exchange access, the additional functions should aid in the transmission or routing of those services.[100]

38. We believe that limiting the functions that a requesting carrier may utilize in collocated multi-functional equipment in this manner reasonably balances the competing interests. As an initial matter, this approach properly recognizes that an incumbent LEC need not allow deployment of multi-functional equipment to the extent the requesting carrier intends to use it to perform functions, like payroll processing or certain types of data collection, that are unrelated to the requesting carrier's ability to obtain "equal in quality" interconnection or "nondiscriminatory" access to unbundled network elements.[101] But beyond that, this approach also recognizes that, given the statutory requirement that an incumbent LEC provide for collocation of necessary "equipment," rather than "necessary "functions," application of our equipment standard to particular multi-functional equipment should focus on whether that equipment meets our equipment standard on an overall, as opposed to a function-by-function, basis.

39. In the context of multi-functional equipment and in light of the concerns expressed by the court, we believe that further refinement of our equipment standard is needed to ensure that the additional functions do not unnecessarily burden incumbent LEC property interests. Specifically, we find that the parties must consider whether the additional functions increase the overall demand on the incumbent's space and other resources above the levels that would prevail if the functions were excluded from the equipment or not activated. If the increase in demand due to the inclusion of additional functions is significant, the equipment would fail to meet the "necessary" standard.[102] For example, a difference in the demand on an incumbent's

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[98] *See* Qwest Comments at 5; Gluon Comments at 4; *WorldCom Mar. 23, 2001 Letter*, *supra* note 7, at 3.

[99] *See* ATG Comment at 3 (indicating that any additional function of collocated equipment that ATG might use are "inextricably intertwined with the primary use of the equipment such that the function cannot be removed").

[100] *See* WorldCom Comments at 9.

[101] *See GTE v. FCC*, 205 F.3d at 424; *see* NAS Comments at 5 (noting that manufacturers have no operational, economic, or technical incentive to integrate payroll and data collection into multi-functional equipment); *WorldCom Mar. 23, 2001 Letter*, *supra* note 7, at 3.

[102] *See* AT&T Comments at 18 (section 251(c)(6) requires incumbents to permit collocation of multi-functional equipment if the additional functions do not cause the equipment to consume appreciably more space than "single-(continued....)

space would be unacceptable if the incumbent had to reconfigure the outer boundaries of a carrier's physical collocation space in order to accommodate the additional functions. Similarly, a difference in demand on an incumbent's other resources would be unacceptable if the additional functions were to require that the incumbent provide floor support beyond that typically available in the incumbent's premises in order to accommodate extremely heavy equipment or that the incumbent upgrade otherwise sufficient power, air conditioning, heating, or similar plant in order to accommodate equipment that places unusually great demand on that infrastructure.[103]

40. We find it reasonable to conclude that an incumbent's property interests (as opposed to its competitive interests) are not implicated by the inclusion of additional functions in collocated equipment or the requesting carrier's activation of those functions unless those actions affect the demand on the incumbent's space and other resources so significantly as to increase the relative burden on the incumbent's property interests.[104] We recognize that much, and perhaps most, of the multi-functional equipment that requesting carriers may wish to collocate is smaller (and therefore requires less space), requires less power, and generates less heat than any available

(Continued from previous page)
use" equipment); *WorldCom Mar. 23, 2001 Letter*, *supra* note 7, at 3 (contending that the Commission could avoid any conceivable "takings" concerns by requiring that multi-functional equipment cannot occupy more space than similar equipment that provides only the interconnection and access functionality); *Salvaty v. Falcon Cable Television*, 165 Cal. App. 3d 798, 803, 212 Cal. Rptr. 31, 35 (Cal. Ct. App. 1985) (*Salvaty v. Falcon Cable*) (attachment of television cable held within the scope of easement permitting placement of poles with telephone and electrical wires on private property because "the addition of cable television equipment to a preexisting utility pole [did not] materially increase burden on [that] property); *accord* Joint Commenters Reply at 13 (arguing that incumbent LECs have not explained how using the additional functions of multi-functional equipment would constitute a greater taking than collocation of that equipment); *see also C/R TV, Inc. v. Shannondale, Inc.*, 27 F.3d 104, 107-08 (4th Cir. 1994) (*C/R TV v. Shannondale*) (examining whether proposed use would "substantially burden" private property as part of determination whether attaching television cable to poles falls within easement for the installation and maintenance of poles having telephone and electrical wires attached).

[103] A difference in the demands on an incumbent's space would be insignificant if the incumbent did not have to reconfigure the outer boundary of a carrier's collocation space in order to accommodate the additional functions. A difference in the demands on an incumbent's other resources would be insignificant if the demands on those resources as a result of the additional functions were roughly comparably to (or less than) the levels that would prevail if those functions were excluded from the equipment or not activated. Thus, the incumbent's property interests would not be burdened simply because the requested equipment is somewhat taller, wider, or heavier, requires marginally more power, produces marginally more heat, or requires some additional maintenance or repair than alternative equipment excluding those functions.

[104] *See* AT&T Comments at 18-19; CompTel Reply at 4 (asserting that incumbents that are truly concerned about space considerations would not seek to foreclose collocation of all multi-functional equipment); Qwest Reply at 4-5 (characterizing as "not well-founded" the suggestion that collocation of multi-functional equipment will necessarily lead to a taking of more incumbent LEC space than the Communication Act authorizes); *see also Salvaty v. Falcon Cable*, 165 Cal. App. 3d at 803, 212 Cal. Rptr. at 35; *C/R TV v. Shannondale*, 27 F.3d at 107-08. *But see* Letter from Michael K. Kellogg, Counsel for SBC, to Magalie Roman Salas, Secretary, FCC, at 3-4 (filed Feb. 1, 2001) (*SBC Feb. 1, 2001 Letter*) (arguing that statute limits scope of authorized collocation by reference to equipment's functions and that collocation of additional functions would impermissibly take incumbent LEC property).

single-function equipment.[105] Collocation of this multi-functional equipment therefore likely would not entail any appreciably greater imposition on the incumbent's space and supporting infrastructure than single-function equipment would entail. In addition, the record indicates that multi-functional equipment is rapidly replacing, if not making obsolete, single-function equipment.[106] To the extent single-function equipment is available, it is unlikely to place significantly lesser demand on the incumbent's space and supporting infrastructure than multi-functional equipment that meets our standard.[107] We therefore find that collocation of multi-functional equipment in the circumstances described above is consistent with the statutory language and purposes.

41. In finding that in certain circumstances collocation of multi-functional equipment is consistent with the statutory language and purposes, we reject, on the one hand, positions that would result in a blanket prohibition of multi-functional equipment and, on the other hand, proposals that would result in the adoption of a standard without real limiting principles. Specifically, we reject BellSouth's, SBC's, and Verizon's argument that an incumbent LEC must be allowed to preclude collocation of any equipment that includes one or more functionalities whose deployment is "unnecessary" for interconnection or access to unbundled network elements.[108] We find this approach to be unreasonably narrow and disconnected from the statutory purposes.[109] As an initial matter, we are not persuaded by BellSouth's, SBC's, and Verizon's argument that the statute compels this approach. On the contrary, this approach would require that section 251(c)(6) limit requesting carriers to collocation of "*functionalities* necessary for interconnection or access to unbundled network elements."[110] We find no basis in the statutory language, broader statutory scheme, or the legislative history for interpreting the statute in this way. Rather, we find it telling that, in the 1996 Act, Congress carefully distinguished between equipment and its functions when it wanted to do so.[111] Thus, we do not find that section 251(c)(6) compels that an incumbent must be able to exclude from collocation any equipment that contains a single functionality that, if offered on a stand-alone basis, would be deemed "unnecessary" for interconnection or access to unbundled network elements.

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[105] @tlink Comments at 24-25; Nortel Comments at 5 (with today's technology, single-function equipment is unlikely to be small or consume less space than multi-functional equipment).

[106] *See, e.g.,* Rhythms Comments at 13-14.

[107] ATG Comments at 4 (contending that collocation of innovative equipment reduces the imposition on an incumbent's property interests that a collocator causes) & Att. 1, p. 1 (asserting that the multifunctional equipment now being developed conforms to accepted compliance standards for space, power, and heat dissipation).

[108] BellSouth Comments at 5; SBC Comments at 10-11; Verizon Comments at 6.

[109] *See* Florida Commission Comments at 3 (arguing that it would be unreasonable to conclude that a specific type of equipment may be collocated only if its sole purpose interconnection or access to unbundled network elements); Tachion Comments at 4 (artificially "dis-integrating" technology or precluding new entrants from using available functions in collocated equipment would create an enormous barrier to competition).

[110] *See SBC Feb. 1, 2001 Letter, supra* note 104, at 3.

[111] *See, e.g.,* 47 U.S.C. § 153(29) (definition of network element).

42. As discussed above,[112] section 251(c)(6) reflects the congressional desire to promote competition and technological innovation, while recognizing the incumbent's interest in using and managing its property. BellSouth's, SBC's, and Verizon's approach toward multi-functional equipment fails to balance these congressional goals, instead focusing solely on the impact multi-functional equipment may have on their property interests.[113] We believe that our approach reasonably balances these interests because it imposes limits on a requesting carrier's ability to collocate and deploy multi-functional equipment that protect the incumbent's property against burdensome intrusions, while permitting requesting carriers a degree of freedom to choose the equipment that best fits their technical and competitive needs.[114]

43. At the other extreme, the proposals of some competitive LECs that would give requesting carriers virtually unrestricted rights regarding multi-functional equipment would allow, at least conceptually, the collocation and activation of a vast array of multi-functional equipment without regard to the effect such actions would have on the incumbents' ability to use and manage their own property.[115] While collocation of this equipment might marginally increase a requesting carrier's ability to compete, such an increase simply does not make any particular piece of equipment "necessary for interconnection or access to unbundled network elements" within the meaning of section 251(c)(6).[116] We find that a more balanced approach, as described above, more appropriately advances the congressional goal of promoting competition and technological innovation without unnecessarily infringing on an incumbent's property interests.

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[112] *See* para. 20, *supra*.

[113] *See generally* RCN Comments at 14 (maintaining that precluding collocation of multi-functional equipment would thwart competition).

[114] *See, e.g.*, Cisco Comments at 11 (observing that limiting the functions that qualify for collocation would place additional burdens on an incumbent's space and other resources); Florida Commission Comments 3 (contending that it is appropriate to consider breath of multi-functional equipment and it use for interconnection or access to unbundled network elements relative to other purposes); Gluon Comments at 3 (asserting that market-opening provisions of 1996 Act would have no point if restrictive equipment functionality were to create artificial barriers to entry); NAS Comments at 6 (contending that precluding collocation of multi-functional equipment would stifle technological innovation); ATG Reply at 3-4; Letter from Christine Mailloux, Regulatory Strategist, Copper Mountain, to Magalie Roman Salas, Secretary, FCC, at 3 (filed May 23, 2001) (*Copper Mountain May 23, 2001 Letter*) (maintaining that overly rigid collocation rules would discourage innovation and widespread deployment of affordable broadband services).

[115] *See, e.g.*, Connectiv Comments at 12 (arguing that incumbent LECs should be required to allow collocation of any multi-functional equipment that contains features or functions that enable interconnection or access to unbundled network elements); Covad Comments at 16 (proposing that a requesting carrier be able collocate any equipment that performs a function necessary for interconnection or access to unbundled network elements); Focal Comments at 12-13 (proposing that a requesting carrier be able to collocate any multi-functional equipment that, as a technical matter, may feasibly be deployed at the incumbent's premises if deployment would facilitate the requesting carrier's ability to compete).

[116] *See GTE v. FCC*, 205 F.3d at 424; *see also AT&T v. Iowa Util. Bd.*, 525 U.S. at 389-90.

5. Other Equipment

44. A number of commenters, including ATG and Sprint, ask that we determine that certain types of equipment are "necessary for interconnection or access to unbundled network elements" within the meaning of section 251(c)(6).[117] This equipment includes optical terminating equipment, fiber distribution frames, ATM multiplexers, concentration devices, DSLAMs, and microwave transmission facilities,[118] as well as splitters,[119] equipment to light dark fiber,[120] and ancillary equipment that enables a requesting carrier to assure proper provisioning and functioning of other collocated equipment.[121] For the most part, there is little, if any, controversy regarding the equipment these commenters seek to collocate.[122] Because we anticipate that incumbents will allow collocation of the non-controversial equipment without further regulatory intervention, we find no need to address whether much of the equipment these commenters seek to collocate meets the equipment standard we adopt in this Order.[123] We also are concerned that any list of "necessary" equipment we might develop would quickly become obsolete as manufacturers develop, and carriers deploy in new ways, the ever-increasing array of equipment that technological advances have made possible. A decision on our part that a particular type of equipment is "unnecessary," given today's network architectures, might

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[117] *E.g.*, AT&T Comments at 20-24; ATG Comments at 2-3 & Att. 1, pp. 2-3; Joint Commenters Comments at 28-29; Northpoint Comments at 3-4; Sprint Comments at 5-7.

[118] *E.g.*, AT&T Comments at 20-23 (transmission equipment, including DSLAMs); ATG Comments at 3 & Att. 1, pp. 2-3 (concentrators, transport equipment, cross-connect systems, multiplexers, DSLAMs, and power distribution equipment); Joint Commenters Comments at 28-29 (transmission equipment, including optical terminating equipment, concentrators, multiplexers); MFN Comments at 13-14 (fiber distribution frames); NAS Comments at 8-14 (arguing that competitive LECs cannot, as a practical, economic, or operational matter, provide digital subscriber line (DSL) service without DSLAMs and ATM equipment); Northpoint Comments at 5-8 (aggregation devices and DSLAMs); Verizon Comments at 7 (classifying as "necessary" multiplexers, concentrators, and DSLAMs used in connection with DSL services); Sprint Comments at 8-9 (ATM multiplexers, DSLAMs, fiber optic terminating equipment, and cross-connect panels); Winstar Comments at 1-6 (microwave transmission facilities).

[119] *E.g.*, Sprint Comments at 9.

[120] Cisco Comments at 7.

[121] *See, e.g.*, Gluon Comments at 3-4 (maintaining that requesting carriers should be able to add equipment management software to collocated equipment); Sprint Comments at 8-9 (referring to network management devices, testing equipment, portable testing equipment, test heads, surveillance equipment, fuse and alarm panels, timing sources, and cabinets for spares); WorldCom Reply at 8-9 (indicating that absent the ability to collocate remote surveillance and telemetry equipment, a carrier could not practicably assure the integrity or proper operation of collocated equipment).

[122] *Compare, e.g.*, Sprint Comments at 8-9 (proposing "safe harbor" list of equipment) *with* Letter from Richard Juhnke, General Attorney, Sprint, to Magalie Roman Salas, Secretary, FCC, at Att., p. 1 (filed Apr. 26, 2001) (*Sprint Apr. 26, 2001 Letter*) (stating that incumbents have not resisted collocation of equipment on proposed "safe harbor" list). *But see* SBC Reply at 17-21 (arguing that some of the equipment listed by Sprint falls outside SBC's proposed definition of "necessary").

[123] *See* AT&T Comments at 20 (observing that the Commission cannot possibly, in the face of rapidly changing technology, determine in advance whether each type of equipment qualifies for collocation).

impede the development of new architectures that expand the services carriers are able to provide their customers.[124]

45. The main controversy on this record with regard to single-function equipment concerns equipment having switching or routing capability.[125] Competitive LECs maintain that they must perform switching and routing functions to access unbundled local loops, and therefore must be able to collocate switching or routing equipment. As explained below, we now agree with competitive LECs that switching or routing capability is necessary to access all the features, functions, and capabilities of unbundled local loops. Specifically, as discussed below, we find that, in certain instances, switching and routing equipment meets our equipment standard and is thus "necessary" equipment entitled to collocation pursuant to section 251(c)(6).[126]

46. Under section 251(c)(3), requesting carriers are entitled to access all the features, functions and capabilities of unbundled network elements. The Commission has previously held that this means that competitors are entitled to more than mere physical access to unbundled local loops.[127] Switching and routing equipment allows a competitor to access the features, functions, and capabilities that accommodate the transmission of voice and data traffic over that loop, between the end user and the specified destination.[128] For purposes of section 251(c)(3), we believe that a switch or router provides a requesting carrier with access to the local loop in a manner functionally equivalent to a DSLAM, the equipment incumbents and their competitors deploy to access the local loop's capability of providing xDSL services and which most commenters, including several incumbent LECS, concede satisfies the "necessary" standard.[129] Without equipment such as a DSLAM, switch, or router, the local loop is merely a transmission medium theoretically capable of carrying telecommunications traffic. To access an unbundled local loop's theoretical capability of providing a telecommunications service, *i.e.*, of accommodating the transmission of information "between or among points specified by the user,"[130] a requesting carrier must, as a practical, economic, and operational matter, be able to switch or route traffic to or from that loop. Therefore, switching and routing equipment is

[124] Letter from Kathleen, M. Marshall, Executive Director, ATG, to William A. Kehoe III, Special Counsel, FCC, at 2 (filed Feb. 25, 2001) (*ATG Feb. 25, 2001 Letter*).

[125] *See* Letter from W. Scott Randolph, Director – Regulatory Affairs, Verizon, to Magalie Roman Salas, Secretary, FCC, at Att., p. 5 (filed May 25, 2001) (*Verizon May 25, 2001 Letter*).

[126] As explained below, application of our equipment standard may allow for certain specific types of switches or routers, but not others. *See* paras. 46-48, *infra*.

[127] *UNE Remand Order*, 15 FCC Rcd at 3772-73, para. 167; *see* 47 C.F.R. § 51.307(c).

[128] *Cf.* 47 U.S.C. § 153(43) (defining "telecommunications").

[129] *See, e.g.*, Qwest Comments at 13-14; Sprint Comments at 8; Verizon Comments at 7.

[130] *See* 47 U.S.C. §§ 153(43), 153(45) (defining "telecommunications" and "telecommunications service").

necessary for accessing all the features, functions, and capabilities of an unbundled local loop that facilitate the transmission of telecommunications traffic.[131]

47. As explained above,[132] however, an inability to deploy a particular piece of switching or routing equipment may not preclude a requesting carrier from obtaining interconnection or obtaining access to unbundled network elements, if deployment of that particular equipment would burden an incumbent's property interests *and* alternative equipment not imposing such a burden were practically, economically, and operationally available to obtain interconnection or access to unbundled network elements consistent with sections 251(c)(2) and 251(c)(3). We find this statement particularly applicable to switching and routing equipment because certain types of switches and routers are dramatically smaller than others, and thus impose significantly lesser burdens on an incumbent's property interests if collocated. Specifically, technological advances have enabled manufacturers to develop relatively small makes and models of switches and routers that resemble and generally are roughly the same size as consumer electronics equipment, such as stereos.[133] We conclude that as a practical, economic, and operational matter, this innovative equipment is available to a requesting carrier to access those features, functions, and capabilities of unbundled local loops for which switching or routing is needed.

48. Although application of our equipment standard would allow these smaller types of switches and routers to be collocated, it will not generally allow collocation of the circuit switches traditionally used to provide telecommunications services. These circuit switches are very large pieces of equipment.[134] For instance, the circuit switches typically available in 1996 for deployment in incumbent LECs' central offices are approximately 100 times the size of the more modern switches and routers that equipment manufacturers have been able to develop. The traditional circuit switches require a separate room; several of the more modern switches and routers can fit comfortably within a typical 10-foot by 10-foot collocation cage.[135] We agree with SBC and Verizon that traditional circuit switching equipment is generally not "necessary" within the meaning of section 251(c)(6) because a requesting carrier would not be practically, economically, or operationally precluded from interconnecting or accessing unbundled network elements pursuant to sections 251(c)(2) and 251(c)(3) if it could not deploy this traditional circuit

[131] See paragraph 53, *infra*, for examples of functions that carriers may not collocate under our equipment standard.

[132] *See* para. 23, *supra*.

[133] *E.g.*, Corecomm Comments at 27; Nortel Comments at 2-3. This equipment includes remote switching modules, which are small switches that are used in conjunction with host switches located in different premises. *E.g.*, AT&T Comments at 25 & Att. 2 (Culmone Declaration), pp. 11-12.

[134] *E.g.*, Corecomm Comments at 27 (stating that a traditional circuit switch requires hundreds of square feet of floor space, while several modern switches or routers can fit comfortably within the space of a typical collocation area).

[135] Corecomm Comments at 27; DSLnet Comments at 32; Telergy Comments at 28.

switching equipment.[136] Specifically, in light of the practical, economic, and operational availability of newer and much smaller switches and routers as well as the lesser burden collocation of that equipment imposes on an incumbent's property interest, we find that traditional circuit switches generally do not meet the equipment standard we adopt today.[137]

49. We emphasize that this finding does not mean that an incumbent LEC's competitors are entitled to collocate any equipment that utilizes the features, functions, and capabilities of the local loop. Section 251(c)(3) provides only telecommunications carriers with the ability to access unbundled network elements. Therefore, parties seeking to use the local loop, for example, only to deliver information services do not have rights under section 251(c)(3) to access that unbundled network element. Since section 251(c)(6) incorporates the obligations and limitations contained in sections 251(c)(2) and 251(c)(3), an incumbent LEC need not allow these parties to collocate such equipment.

50. We recognize that this conclusion differs from the Commission's prior holding that stand-alone switches or routers are not entitled to collocation pursuant to section 251(c)(6) in any instance.[138] We find here, however, that the Commission's prior analyses of the statutory standard were incomplete because they did not fully address the different purposes for which requesting carriers might deploy "necessary" equipment. For instance, in the *Local Competition Order*, the Commission, in finding switching equipment unnecessary, stated that "it [did] not appear that [this equipment] is used for the actual interconnection or access to unbundled network elements."[139] Subsequently, in the *Advanced Services First Report and Order*, the Commission declined to classify equipment used exclusively for switching as "necessary," because it did "not find sufficient support in the record at this time for such a requirement."[140] In neither case did the Commission explain how a requesting carrier could access all the features, functions, and capabilities of a local loop without switching or routing equipment.[141]

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[136] *See* paras. 21-23, *supra*; SBC Comments at 14; Verizon Reply at 2-3; *SBC May 23, 2001 Letter*, *supra* note 87, at Att.; *see also* AT&T Reply at 34.

[137] We note that the record indicates that equipment housing newer, packet-based switching and routing technology generally is dramatically smaller than traditional, circuit switches and continues to evolve through the use of even smaller components. *See, e.g.*, AT&T Comments at 25-26; Cisco Comments at 7; Tachion Comments at 2; AT&T Reply at 23. To the extent this trend does not continue in the future and, instead, the size of switching and routing equipment begins to significantly increase, we may need to revisit our finding.

[138] *See Advanced Services First Report and Order*, 14 FCC Rcd at 4778-79, para. 31; *Local Competition Order*, 11 FCC Rcd at 15794, para. 581.

[139] *Local Competition Order*, 11 FCC Rcd at 15795, para. 581.

[140] *Advanced Services First Report and Order*, 14 FCC Rcd at 4778-79, para. 31.

[141] *See* Cisco Comments at 7 (noting that the treatment of switching in the *Local Competition Order* focused solely on interconnection for circuit-switched technologies); Corecomm Comments at 22 (pointing out that the Commission has never found that switches do not perform interconnection or network access functions).

51. We now have the benefit of a greatly expanded record that reflects both the parties' several years of experience with the unbundled network access regime established in the 1996 Act as well as the technical expertise of many equipment manufacturers.[142] This greatly expanded record has enabled us to refine our analysis within the framework the D.C. Circuit established and the equipment standard we adopt in accordance with that framework.[143] Based on this record, we are now convinced that, as a practical, economic, or operational matter, a requesting carrier may require switching or routing equipment to be able to access all of the features, functions, or capabilities of unbundled local loops.

52. Although we find, in a reversal of the Commission's previous findings in the 1996 *Local Competition Order* and *Advanced Services First Report and Order*, that switching and routing equipment satisfy the "necessary" standard in certain instances, we emphasize that our equipment standard has clear limiting principles that operate to provide more definitive boundaries than the Commission's previous standard. The Commission's previous standard, as applied in the *Advanced Services First Report and Order*, provided requesting carriers with virtually limitless control over the types of equipment that they could collocate.

53. The equipment standard we adopt today places clear limits on the types of functions for which competitors may collocate equipment. Our standard does not allow competitors to collocate much of the equipment that they must rely on to operate, service, and support their own networks. Therefore, our standard would not result in an incumbent LEC's premises being used by a competitor to house all of the equipment necessary to operate, service, and support its own network. For example, our standard would not require that an incumbent LEC allow collocation of equipment used exclusively for call-related databases, computer servers used exclusively for providing information services, and a whole host of operations support system (OSS) equipment that most competitors must rely on to support their network operations. Nor would our standard let a requesting carrier insist on collocating equipment that generates customer orders, manages trouble tickets or inventory, or stores customer records in centralized databases.[144] In addition, in the multifunction context, our standard places significant limits on the ability to collocate multifunction equipment by ensuring that the equipment's primary functionality is used for interconnection or accessing unbundled network elements while ensuring that multifunction equipment places no greater relative burden on the incumbent's

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[142] *See, e.g., Copper Mountain Mar. 1, 2001 Letter, supra* note 7, at 1-2; Gluon Comments at 2-3; AT&T Comments at 24-32.

[143] *See generally* Telergy Comments at 28-29 (arguing that we must periodically review our collocation rules in light of technological developments); Letter from Frank S. Simone, Government Affairs Director, AT&T, to Magalie Roman Salas, Secretary, FCC, at Att. 2 (Physical Collocation White Paper), p. 5 (filed Dec. 12, 2001) (*AT&T Dec. 12, 2001 Letter*) (maintaining that the Commission is entitled, if not obligated, to reassess whether it can require that incumbents permit collocation of switching equipment).

[144] *See generally ATG Feb. 25, 2001 Letter, supra* note 124, at 3-4; *ATG Feb. 25, 2001 Letter, supra* note 124, at 3-4. We note that as network architectures and equipment offerings evolve, additional types of equipment may become "necessary" to obtaining "equal in quality" interconnection or "nondiscriminatory" access to unbundled network elements. We do not preclude a requesting carrier from asserting that any particular telecommunications-related function meets our equipment standard.

property than comparable single-function equipment. The Commission's previous test did not place such clear limits on the types of equipment that are eligible for collocation. Finally, equipment that does not provide telecommunications services would not qualify for collocation under our standard.

54. We believe our standard reasonably reflects the balance required by section 251(c)(6)'s cross-purposes of promoting competition and innovation while ensuring adequate protection of the incumbent LECs' legitimate property interests. On one hand, our standard ensures that an incumbent LEC's telecommunications competitors cannot place equipment in collocation space with unfettered discretion, but rather must limit their collocation choices to equipment that is necessary for these carriers to achieve the enunciated statutory purposes of interconnection and access of unbundled network elements. On the other hand, it ensures that incumbent LECs cannot exercise *de facto* veto power over their collocated competitors' choice of equipment and network architecture, and instead grants competitors sufficient flexibility with which to make reasonable equipment choices that overcome practical, economic, and operational constraints in a manner that protects the incumbent's property interests.

C. Cross-Connections Between Collocators

55. In the *Local Competition Order*, the Commission required incumbent LECs to provision (*i.e.*, install and maintain) cross-connects to allow a collocator to connect its collocated equipment to the collocated equipment of another carrier within the same incumbent LEC premises so long as each collocator's equipment was used for interconnection with the incumbent or access to the incumbent's unbundled network elements.[145] In the *Advanced Services First Report and Order*, the Commission further required incumbent LECs to permit collocating carriers to provision their own cross-connect facilities between equipment collocated at the incumbent's premises, subject only to the same reasonable safety requirements the incumbent places on its own facilities.[146]

56. In *GTE v. FCC*, the D.C. Circuit vacated and remanded the cross-connects rule adopted in the *Advanced Services First Report and Order*.[147] The court stated that "requiring [incumbent] LECs to allow collocating competitors to interconnect their equipment with other collocating carriers . . . imposes an obligation on [incumbent] LECs that has no apparent basis in the statute."[148] The court found that the Commission had not shown that cross-connects between

[145] *Local Competition Order*, 11 FCC Rcd at 15801-02, para. 594-95. This rule was never directly challenged on appeal. *See generally Iowa Util. Bd. v. FCC*, 120 F.3d at 818 (finding the Commission's rules and policies regarding an incumbent LEC's duty to provide physical collocation to be consistent with section 251(c)(6)).

[146] *Advanced Services First Report and Order*, 14 FCC Rcd at 4779-80, para. 33.

[147] *GTE v. FCC*, 205 F.3d at 423-24 (vacating and remanding "offending portions" of the *Advanced Services First Report and Order*).

[148] *Id. at* 423.

collocators are "necessary for interconnection or access to unbundled network elements" within the meaning of that provision.[149]

57. In the *Second Further Notice*, the Commission invited comment on whether section 251(c)(6) encompasses cross-connects between collocators.[150] The Commission also invited comment on whether it may, pursuant to section 251(c)(6), require that an incumbent LEC permit collocators to construct their own cross-connects as opposed to obtaining them from the incumbent.[151] The Commission invited comment, in addition, on whether it may require an incumbent LEC to provide physical connections between two collocators pursuant to any other provision of the Communications Act.[152]

58. As an initial matter, we believe it is important to define cross-connects and describe how prevalent they are in a typical central office. "A cross-connection [or cross-connect] is a cabling scheme between cabling runs, subsystems, and equipment using patch cords or jumper wires that attach to connection hardware on each end."[153] Typically, in a central office, the cabling scheme might run from a piece of equipment up into an overhead racking system, through that system and down from the racks to connect with another piece of equipment. Cross-connects can run through the main distribution frame or an intermediate distribution frame when being used to connect two pieces of equipment or when being used to connect equipment to a transmission facility, such as a loop or trunk. When two pieces of equipment are in close proximity to each other, the cross-connect may progress directly from one piece of equipment to the other without entering the racking system. Cross-connects generally are present throughout the incumbent's premises. Cross-connects interconnect incumbent LEC equipment to other incumbent LEC equipment and incumbent LEC equipment to collocator equipment. Cross-connects also interconnect one piece of a collocator's equipment to another piece of that collocator's equipment. Finally, because of the Commission's previous cross-connect rule adopted in the *Local Competition Order*, cross-connects have been used to interconnect one collocator's equipment to another collocator's equipment.[154]

59. At issue in this *Order* are the cables that cross-connect two collocated competitive LECs. As explained below, we find that, in light of *GTE v. FCC*, we may not require an incumbent LEC to allow competitive LECs to provision cross-connects outside of their

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[149] *Id.*

[150] *Second Further Notice*, 15 FCC Rcd at 17846, para. 88.

[151] *Id.* at 17847, para. 91.

[152] *Id.* at 17846, para. 89.

[153] John Vacca, The Cabling Handbook, 151 (Prentice Hall 1998). As used in this definition, a cabling run includes dark fiber; *see also* Newton's Telecom Dictionary, 206 (15th ed. 1999) (a cross-connection or cross-connect is "[a] connection scheme between cabling runs, subsystems, and equipment using patch cords or jumpers that attach to connecting hardware on each end"); *see also UNE Remand Order*, 15 FCC Rcd at 3778, n.332.

[154] *See Local Competition Order*, 11 FCC Rcd at 15801-02, para. 594.

immediate physical collocation space at the incumbent's premises. However, we find that pursuant to section 201 that it would be unjust and unreasonable for an incumbent LEC to refuse to provision cross-connects between two collocated competitive LECs. We also find that, in the alternative, such a refusal would be unjust, unreasonable, and discriminatory within the meaning of section 251(c)(6). Accordingly, we return to the obligations set forth in the *Local Competition Order* that required incumbent LECs to provision cross-connects to collocators.

60. We find that there are significant differences between requiring the incumbent to provision the cross-connects for collocated competitive LECs and requiring an incumbent LEC to allow competitive LECs to provision cross-connects within the incumbent's premises. First, there is a fundamental difference as to who owns and controls the cross-connect cabling. When competitive LECs provision their own cross-connects, the competitive LECs own and control the cabling; whereas, when the incumbent provisions the cross-connects, the incumbent owns and controls the cabling. Second, for competitive LECs to provision cross-connects, they typically must access common areas, which may include a racking system, of the incumbent's premises to install and maintain the cross-connects.[155] In contrast, if the incumbent provisions the cross-connects, the competitive LECs need not have access to the common areas for the purpose of provisioning the cross-connects. Thus, the latter approach is substantially less invasive of the incumbent's property rights (*e.g.*, in terms of security, safety, and risk to incumbent LEC equipment).[156]

1. Competitive LEC Self-Provisioning of Cross-Connects

61. We find that neither section 201 nor section 251 authorizes us to adopt a rule requiring physical collocation by which incumbent LECs allow competitive LECs to provision cross-connects outside of their immediate collocation space. Specifically, we conclude, in accordance with the D.C. Circuit's decision, that competitive LEC provisioning of cross-connects between two separate collocation arrangements constitutes physical collocation because the competitive LEC-owned cable would typically occupy space in the incumbent's premises outside of the collocator's immediate collocation space and because the collocator would have to access areas of the incumbent's premises outside that immediate collocation space in order to install and maintain the cabling.[157] Thus, such a requirement would have to satisfy the

[155] As used in this Order, "common areas" refers to areas on an incumbent LEC's premises outside of a physical collocator's immediate collocation space. Many common areas contain facilities or equipment serving multiple carriers.

[156] We note that on March 15, 2001, the Coalition of Competitive Fiber Providers filed a petition for a declaratory ruling seeking pursuant to sections 224(f)(1) and 251(b)(4) of the Communications Act, 47 U.S.C. §§ 224(f)(1), 251(b)(4), that incumbent LECs must provide to telecommunications carriers non-discriminatory access to any duct, conduit, or right-of-way owned or controlled by an incumbent and leading to, or located in the incumbent's central office. This Order does not address that petition or otherwise determine any entity's rights and obligations under section 224.

[157] We note that prior to the D.C. Circuit's decision in *GTE v. FCC*, the Commission viewed cross-connects between a collocator and another carrier (*i.e.*, either the incumbent or another collocator) as a means of connecting the collocator's equipment to the other carrier's network. *See UNE Remand Order*, 15 FCC Rcd at 3778, para. 179; *Local Competition Order*, 11 FCC Rcd at 15801-02, para. 594. However, as the D.C. Circuit implicitly recognized, (continued....)