Exhibit 1-7 ◆ Major Broadband Services Public Equity Financings

Date	Company	Amount ($mil.)	Details
Apr-00	Network Plus	130.5	Follow-on offering
Apr-00	TriVergent Communications	172.5	IPO
Apr-00	Teligent	200.0	Follow-on offering
Mar-00	Teligent	191.0	Follow-on offering
Mar-00	FirstWorld Communications	170.0	IPO
Mar-00	Net2000 Communications	200.0	IPO
Feb-00	Choice One Communications	164.0	IPO
Feb-00	Mpower Communications	332.8	Follow-on offering
Feb-00	Cypress Communications	170.0	IPO
Feb-00	DSL.net	149.5	Follow-on offering
Jan-00	Allegiance Telecom	665.6	Follow-on offering
Nov-99	Adelphia Business Solutions	262.5	Follow-on offering
Nov-99	Covad Communications	503.0	Follow-on offering
Nov-99	Pac-West Telecom	126	IPO
Oct-99	Allied Riser Communications	283.5	IPO
Oct-99	DSL.net	62.0	IPO
Aug-99	Rhythms NetConnections	114.9	Follow-on offering
Aug-99	Splitrock Services	90.0	IPO
Jul-99	Mpower Communications	146.0	Follow-on offering
Jul-99	Voyager.net	135.0	IPO
Jul-99	Convergent Communications	126.0	IPO
Jun-99	Covad Communications	285.0	Follow-on offering
Jun-99	Network Access Solutions	90.0	IPO
May-99	RCN Corp.	312.0	Follow-on offering
May-99	NEXTLINK Communications	321.5	Follow-on offering
May-99	CAIS Internet	114.0	IPO
May-99	McLeodUSA	500.6	Follow-on offering
May-99	TimeWarner Telecom	178.0	IPO
May-99	NorthPoint Communications	360.0	IPO
Apr-99	Log On America	22.0	IPO
Apr-99	Allegiance Telecom	449.0	Follow-on offering
Apr-99	Rhythms NetConnections	226.4	IPO
Mar-99	CapRock Communications	88.0	Follow-on offering
Feb-99	Winstar Communications	175.4	Follow-on offering
Jan-99	Covad Communications	161.5	IPO

Source: Bloomberg and Dain Rauscher Wessels

Exhibit 1-8 ◆ Major Broadband Services Public Debt Financings

Date	Company	Amount ($mil)	Details
May-00	McLeodUSA	$1,300.0	Senior secured credit facility
May-00	Choice One Communications	350.0	Senior secured facility and senior unsecured bridge facility
Apr-00	Net2000 Communications	200.0	Senior secured facility
Apr-00	Time Warner Telecom	475.0	Senior secured facility
Apr-00	FiberNet	75.0	Senior secured facility
Apr-00	ITC Deltacom	160.0	Syndicated secured bank facility.
Apr-00	CTC Communications	225.0	Revolving credit facility and Term Loans.
Mar-00	Winstar Communications	1,880.0	Senior Notes and Euros.
Mar-00	Mpower Communications	250.0	13.0% Senior notes due April 2010.
Mar-00	Network Plus	225.0	Senior secured credit facility.
Mar-00	Winstar Communications	1,000.0	Senior secured credit facility
Feb-00	TriVergent Communications	120.0	Senior secured credit facility
Feb-00	Birch Telecom	125.0	Senior secured credit facility, revolver, and multi-draw loan
Feb-00	Rhythms NetConnections	300.0	14% senior notes due 2010
Feb-00	Allegiance Telecom	500.0	Senior secured credit facilities.
Feb-00	NEXTLINK Communications	1,000.0	Senior secured credit facility
Feb-00	NorthPoint Communications	400.0	12.875% senior notes due 2010
Jan-00	CTC Communications	225.0	Senior secured credit facility
Jan-00	Covad Communications	425.0	12% senior notes due 2010.
Jan-00	Intermedia Communications	400.0	$400 million bank facility
Jan-00	Focal Communications Corp.	275.0	11.875% senior notes due 2010.
Jan-00	Allegiance Telecom	500.0	Secured credit facility.
Dec-99	RCN Corporation	375.0	Senior notes due Dec 2009.
Dec-99	NorthPoint Communications	250.0	Senior secured credit facilities.
Nov-99	US LEC	150.0	Credit facility.
Nov-99	Metromedia Fiber Networks	1,000.0	$1.0 billion of senior notes.
Aug-99	ICG Communications	200.0	Loan facility repayable in 2005 and 2006.
Jun-99	RCN Corp.	1,000.0	$1 billion bank facility.
Jun-99	TALK.com	50.0	Senior secured credit facility.
May-99	NEXTLINK Communications	1,263.9	10.75% and 12.25% senior notes
Apr-99	ITC Deltacom	125.0	9.75% Senior notes due 2008.
Apr-99	Electric Lightwave	325.0	Senior unsecured notes due Apr 2004.
Apr-99	Rhythms NetConnections	325.0	Senior notes
Apr-99	e.spire Communications	200.0	Senior secured credit facility
Apr-99	Allegiance Telecom	225.0	Senior secured credit facility.
Mar-99	CapRock Communications	210.0	11.5% Senior notes due May 2009.
Feb-99	Covad Communications	215.0	12.5% Senior notes due February 2009.

Source: Bloomberg and Dain Rauscher Wessels

When the public markets become tight, it becomes crucial for companies to be pre-funded and/or to be able to tap alternative sources of capital to fund their business plans. The past 18 months have seen a significant infusion of equity capital into the broadband services sector from private-equity and strategic investors. **Exhibit 1-9** highlights several of these investments.

Exhibit 1-9 ◆ Major Broadband Services Private Equity Investments

Date	Company	Investors	Amount ($mil.)
May-00	NEXTLINK Communications	Forstmann Little & Co.	$400.0
Apr-00	Convergent Communications	Texas Pacific Group Sandler Capital Management	175.0
Apr-00	US LEC	Bain Capital Thomas H. Lee Partners	200.0
Apr-00	ICG Communications	Liberty Media Group Hicks, Muse, Tate & Furst Gleacher Capital Partners Teligent	750.0
Apr-00	ITC DeltaCom	Morgan Stanley Banc of America Securities Goldman Sachs	160.0
Mar-00	CTC Communications	Bain Capital Thomas H. Lee Partners Credit Suisse First Boston	200.0
Mar-00	Talk.com	Soros Private Equity Partners	80.0
Feb-00	CAIS Internet	Kohlberg Kravis Roberts & Co.	73.9
Feb-00	e.spire Communications	Honeywell International Allied Capital Management Greenwich Street Capital Partners' Huff Alternative Income Fund	175.0
Feb-00	Intermedia Communications	Kohlberg Kravis & Roberts Microsoft & Compaq	200.0 100.0
Feb-00	Rhythms NetConnections	Hicks, Muse, Tate & Furst	250.0
Feb-00	WinStar Communications	Microsoft Credit Suisse First Boston Welsh, Carson, Anderson & Stowe Cascade Investments	900.0
Dec-99	NEXTLINK Communications	Forstmann Little & Co.	850.0
Nov-99	Teligent	Microsoft Hicks, Muse, Tate & Furst DB Capital Partners Olympus Partners	500.0
Oct-99	FiberNet Telecom	Signal Equity Partners	12.5
Oct-99	RCN Corp.	Vulcan Ventures	1,650.0
Sep-99	Allegiance Telecom	Vulcan Ventures	75.0

continued on following page

Source: Bloomberg, Company reports, and Dain Rauscher Wessels

Exhibit 1-9 ◆ Major Broadband Services Private Equity Investments, cont.			
Sep-99	Advanced Radio Telecom	Qwest Communications Oak Investment Partners Meritech Capital Partners Advent International Columbia Capital Accel Partners Brentwood Venture Capital Worldview Technology Partners Bessemer Venture Partners Adams Capital Management	251.0
Aug-99	McLeodUSA	Forstmann Little & Co.	1,000.0
Apr-99	Mpower Communications	Providence Equity Partners JK&B Capital Wind Point Partners	47.5
Mar-99	RCN Corp.	Hicks, Muse, Tate & Furst	250.0
Apr-98	CTC Communications	Spectrum Equity Investors	12.0

Source: Bloomberg, Company reports, and Dain Rauscher Wessels

Consolidation Themes

The rapid growth in broadband services is fostering the much-heralded industry objective of convergence. The move toward integrated services is not new, and in fact has steadily progressed since the passage of the 1996 Telecommunications Act. Competitive providers have accomplished this through M&A activity as well as through home-grown efforts. On the acquisition front, MFS, the largest CLEC at the time, started the ball rolling with its 1996 acquisition of UUNet, a major Internet service provider. This was followed by Teleport Communications Group's acquisition of Cerfnet, an Internet service provider, and AT&T's acquisition of Teleport.

Strategic investment and M&A activity in the broadband services sectors have been driven by a combination of factors, including:

- **Geographic Expansion:** Mergers among competitive local providers are often motivated by a desire to expand the addressable market by creating a larger service footprint.
- **Service Breadth:** As with the original MFS-UUNet deal, mergers between CLECs and ISPs create a powerful broadband capability, often combining multiple voice, data, and Internet-related services into a bundled offering. Carriers with the capability of providing multiple services in one connection have the potential to realize cost efficiencies, higher customer retention, and ultimately higher margins.
- **Technology Breadth:** As the various broadband technologies entail tradeoffs with respect to performance, cost, and market reach, carriers must increasingly rely on multiple technologies and market-entry approaches to reach their objectives.
- **Strategic Entry:** Deals between long-haul carriers and local competitors provide a broader service portfolio and facilitate the long-distance carriers' entry into the local market through the acquisition of local infrastructure assets.

The following exhibit highlights the major strategic investments and M&A deals that have taken place in the competitive broadband sector.

Exhibit 1-10 ◆ Broadband Services: Major Strategic Investments and Merger and Acquisitions Activity

Date Announced	Date Completed	Acquirer	Target	Price ($mil.)		Rationale
May-00	May-00	DSL.net	VISI.com	$12.8		Expansion of Web hosting and collocation services.
May-00	Pending	Choice One	US Xchange	517.5		Footprint expansion.
Apr-00	Pending	Mpower Communications Corp.	Primary Network Holdings	145.0		Footprint expansion.
Jan-00	Apr-00	Z-Tel Technologies	Touch 1 Communications	37.6		Expansion of back-office capacity.
Jan-00	Apr-00	McLeod USA	Splitrock	2,100.0		Enhancement of internet and data-related services.
Mar-00	Pending	TALK.com	Access One	200.0		Acceleration of local market entry.
Feb-00	Mar-00	SBC/Telmex	Network Access Solutions	150.0	*	Funds NAS' expansion to BLS and USW regions.
Mar-00	Completed	Covad Communication	Laserlink.net	409.0		Provision of wholesale Internet services.
Oct-99	Mar-00	Bell Atlantic Corp.	Metromedia Fiber Network	1,700.0	*	Access to regional and local fiber assets.
Jan-00	Pending	NEXTLINK	Concentric Networks	2,900.0		Acceleration of data, Internet, and hosting offerings.
Dec-99	May-00	RCN Corp.	21st Century Telecom	510.0		Footprint expansion to Midwest.
Jul-99	Nov-99	Broadwing (Cincinnati Bell)	IXC Communications	3,200.0		Combination of local and long-haul capabilities.
Sep-99	Sep-99	Qwest-led group	Advanced Radio Telecom	251.0	*	Access to broadband wireless assets.
Jun-99	Sep-99	Metromedia Fiber Network	AboveNet Communications	1,370.0		Expansion of Internet, collocation, and hosting offerings.
Jun-99	Aug-99	McLeodUSA	Access Communications	248.0		Footprint expansion.
Apr/Jul-99	Sep/Oct-99	MCI Worldcom	Four wireless cable operators **	1,000.0		Broadband wireless assets.
Apr/Jul-99	Sep/Oct-99	Sprint	Six wireless cable operators ***	1,200.0		Broadband wireless assets.
Jan-99	Mar-99	McLeodUSA	Ovation Communications	375.0		Footprint expansion
Oct-98	Mar-99	McLeodUSA	Dakota Telecom	76.6		Footprint expansion.
Jan-98	Jul-98	AT&T	Teleport	11,300.0		Acceleration of local market entry.
Jan-98	Jan-98	NEXTLINK	WNP Communications	695.0		Acquisition of LMDS broadband wireless assets.
Oct-97	Jan-98	MCI Worldcom	Brooks Fiber	2,900.0		Accelerates local market entry.
Oct-97	Jan-98	ICG Communications	NetCom	283.5		Accelerates Internet service offerings.
Jun-05	1998	RCN Corporation	Four regional ISPs ****	N/A		Accelerates Internet service offerings.
Jun-97	Jul-97	Intermedia	Digex	150.0		Accelerates Internet service offerings.
Aug-96	Dec-96	MCI Worldcom	MFS Communications	12,600.0		Enter Local Markets.

* Strategic investment

** In 1999, MCI Worldcom acquired CAI Wireless, Prime One, CS Wireless, and Wireless One for approximately $1.0 billion

*** In 1999, Sprint acquired People Choice TV, American Telecasting, Wireless Broadcasting, Nashville Cable Joint Venture, Videotron and Transworld Communications for approximately $1.2 billion.

**** In 1998, RCN Corporation acquired Erol's, UltraNet, JavaNet and Interport.

Source: Dain Rauscher Wessels

In each of these cases, the transactions provided carriers with the ability to offer not just competitive local services, but also a combination of data, long distance, hosting, collocation, and Internet access services. We believe that the quest to offer additional services, deliver them using the most cost-efficient technology, and expand market reach should continue to drive strategic investment and consolidation in the broadband sector.

Of note, pursuit of these goals is not limited to M&A activity. Many competitors have expanded their services by becoming their own ISPs, acquiring long-haul capacity from fiber providers, and private-labeling the hosting and collocation services of third parties.

◆ Solutions, Not Bandwidth

In keeping with our technology-agnostic thesis, we believe sustainable value creation will result from providing customer solutions, and not just by delivering high-speed connectivity over one transmission medium or the other. While we see a solid and growing opportunity to carry data and voice traffic over broadband networks, we think one of the keys to achieving high-margin growth and avoiding price competition will be to own a customer base that can be leveraged to sell enhanced services and solutions on top of core bandwidth.

Competitive providers that can take advantage of their broadband assets and freedom from legacy back-office systems to deliver differentiated services will be particularly well positioned. We believe that firms that add value to bandwidth by facilitating access to applications, content, and specialized services will experience the most sustainable growth. Key elements of this strategy include maintaining a robust operations support system (OSS); offering a compelling service bundle; and facilitating access to content, portals, and applications.

OSS as a Service Differentiator

Given the high demand for broadband services, the key challenge facing most carriers lies in keeping up with this demand rather than convincing customers of the need for a particular service. Among the most important facilitators of successful market entry, service execution, network scalability, and product differentiation is a smoothly functioning operations support system (OSS). The topic of OSS is worthy of special mention because it influences so many different success factors for a competitive carrier, such as product development and marketing; timely service installation, additions, or changes; efficient network operations; accurate billing; and responsive customer support. OSS thus plays a central role in tying together the network with many different business functions. The following items are the major elements of an OSS:

Order Management and Service Installation: This function includes the processing of service requests, coordinating the activities of field service technicians, and every step in between, which often entails services that are leased or resold from other carriers. Much of the complexity in these processes is not that each step is time consuming, but rather that so many different tasks must flow between departments (and often between companies), which introduces delay and the potential for miscommunication. Although still largely a manual process, many service providers are using automation to complete order entries, qualify service requests, and coordinate installation.

Network Operations and Maintenance: This function includes monitoring the performance of the overall network as well as customers' traffic to and from the network. Given the frequent interdependence of multiple carriers in delivering service to a single end user, a carrier's ability to monitor service performance and quickly diagnose problems becomes

critical. A strong OSS can enable a service provider to efficiently diagnose network faults and reduce system downtime, which is an important consideration when carriers are held financially accountable for living up to quality of service agreements.

Billing and Customer Support: This function entails tracking customer usage data and correlating with the terms of specific service bundles to ensure an accurate and integrated bill. This process can be highly complex when customers take multiple services that are delivered across the networks of multiple suppliers. Beyond the goal of delivering accurate bills on a timely basis, many carriers use OSS billing tools to allow for Web-based bill presentment, which enables customers to sort through usage data and use the bill as more of a management tool, rather than simply a means of paying invoices.

Given the preponderance of commercially available OSS modules for individual functions, the integration of different OSS components is a significant challenge. However, carriers that are able to successfully integrate disparate OSS modules (or develop them on their own) have a significant competitive advantage.

With a well-coordinated OSS, service providers are better able to react to market changes by implementing pricing changes or designing new service bundles. An early illustration of this was MCI's Friends and Family pricing plan, which AT&T was not able to match because its OSS was not robust enough. As a more recent example of service differentiation through OSS, many carriers are finding that providing customers with the ability to monitor in detail their billing and usage patterns through the Web can be a powerful tool for sales and customer retention. For wholesale carriers, OSS can be a key success factor as customers increasingly look for the ability to link their provisioning, customer care, and network monitoring tools with their suppliers.

The Importance of Service Bundles

As consumers and businesses subscribe to more varied services, the value proposition between service providers and customers is expanded. Carriers that have the ability to offer a full array of service offerings are increasingly valued by customers, and it is becoming more common to find bundled service offerings aimed at SMBs that include a combination of local and long-distance service; high-speed Internet access; Web hosting; and remote LAN access. Depending on their network assets, firms can use various strategies to implement such offerings, from providing all services over their own facilities to partnering with an ISP, hosting firm, voice provider, or other party to fill out the service bundle. Regardless of the strategy, firms that are able to participate in multiple, broadband-related revenue streams are generally able to achieve the following advantages:

- **Margin Enhancement:** Carriers with the capability of providing multiple services in one connection have the potential to realize efficiencies in overhead (billing and other back-office operations). Further, providing a multi-service bundle to a new customer or cross-selling additional services to an existing customer usually reduces the incremental cost of selling a particular service.
- **Customer Retention:** Offering a customized service bundle to a business customer generally makes it less likely that the customer will switch for another service provider. Such targeted offerings are a key factor behind the low churn rates posted by industry-leading integrated carriers.
- **Competition Based on Value, Not Price:** While many firms that subscribe to broadband service bundles are certainly looking for the best value they can obtain, we believe that the primary reason they opt for broadband services is for increased productivity as opposed to cost savings.

As we pointed out in the previous section, the design and delivery of a multi-service bundle is closely related to the capabilities of a carrier's OSS. Also, as indicated in M&A discussion, the enhancement of service bundles has proven to be a primary factor in many acquisitions and strategic investments.

Facilitating Access to Content, Portals, and Applications

Many broadband providers have begun trials aimed at bringing video, audio, and other content to their broadband customer bases. The idea is to utilize these operators' decentralized infrastructure to host content and caching servers at the edges of the Internet, closer to end users; and leverage their high-speed, last-mile connections to those end users. As the emerging business relationships sort themselves out among ISPs, hosting companies, content delivery firms, and broadband service providers, these firms can be each other's customers and partners. In some cases, content delivery firms may pay carriers to place servers in their networks, while in others, fees may not be exchanged because of the mutual benefit each derives in bringing about faster content delivery.

Beyond content delivery, some providers have begun exploring ways in which to facilitate access to business applications and value-added services. These moves can benefit carriers in multiple ways, for instance by contributing to a "stickier" customer relationship and potentially creating additional revenue streams. **Exhibit 1-11** depicts several recent initiatives that broadband competitors have undertaken in conjunction with content delivery, portal, and application partners.

Exhibit 1-11 ◆ Selected Partnerships Between Broadband Carriers and Content/Application/Portal Providers

Carrier	Content/Application Partners	Description
Covad	iBeam, Intervu, Real Networks	content delivery, streaming media
Rhythms	iBeam, Digital Island, Akamai	content delivery, streaming media
Northpoint	iBeam, Akamai, ClearBand, CoolCast, Digital Island	content delivery, streaming media
Mpower	Bigtro, BizBuyer.com	payroll, procurement, quote requests and other applications
Allegiance	Go2Net	small business resource portal, with future applications planned
DSL.net	ADP	payroll and human resource applications
WinStar	Office.com, Microsoft	office software applications, small business resource portal
McleodUSA	Intel Internet Media Services	business-to-business streaming media presentations

Source: Company reports and Dain Rauscher Wessels

IT and Desktop Management Services: Over time, we believe that broadband service providers will be able to extend their relationships with customers to not only provide value-added content and applications, but also outsourced services such as desktop and local-area-network management. By installing specialized equipment, such as integrated access devices, at the customer site, and hooking up clients' servers, PCs, and routers, broadband competitors can gain a high degree of visibility to the business customer and position themselves as a full-service provider of outsourced IT services. We believe that small and medium-sized businesses are prime targets for such services because they often lack dedicated or trained resources to support a presence on the Web or install and maintain enterprise software. Outsourcing provides the added benefit of reducing customers' capital outlays and ongoing maintenance requirements and allowing them to focus on their core businesses.

◆ **Investment Summary**

Compelling Broadband Opportunity

The growing demand for bandwidth and broadband services is an irreversible trend. We believe there will continue to be a solid and expanding opportunity to carry data and voice traffic and to own a customer base that can be leveraged to sell enhanced services on top of core bandwidth. As such, we are bullish on the growth and profit opportunities for competitive broadband providers. These companies are displacing incumbent market share in the $250-plus billion telecommunications services market and are well positioned to benefit from the ongoing growth in Internet, hosting, and content-related services.

Many Promising Enabling Technologies

Several technologies have emerged as viable broadband delivery options to businesses and residences—cable, digital subscriber line (DSL), broadband wireless, and fiber. Each has attracted pure-play services models that feature robust market demand, attractive unit economics, and high cash-flow visibility. As these technologies are in many respects complementary, and each has its relative strengths with respect to throughput, capital efficiency, and market reach, we expect many service providers to adopt a multi-technology approach to last-mile services in order to optimize network reach.

Numerous Viable Market-Entry Approaches

Using an abundance of market-entry options in major markets, including unbundled network element, lease, resale, and facilities-based approaches, many service providers are able to optimize such factors as capital deployment, network expense, speed to market, throughput, and customer reach. In our opinion, smart-build, hybrid-technology, and building-centric service providers show excellent promise as ways to play the demand for bandwidth and enhanced services.

Think Solutions, Not Bandwidth

In keeping with the technology-agnostic approach toward breaking the bandwidth bottleneck, we believe that sustainable value creation will result from delivering solutions, not just bandwidth. We believe that firms adding value to bandwidth by facilitating access to applications, content, and specialized services will experience the most sustainable growth.

Execution is Key

On balance, competitive providers find little difficulty in generating demand for their services, as they compete mostly against a slow-to-innovate incumbent. Thus, we believe success will hinge largely on competitors' abilities to accommodate rapid growth while offering superior service and reliability. This will come through strong execution on such items as provisioning, billing, service reliability, and customer support.

Market Catalysts

The competitive broadband segment has seen a steady wave of both smart-money investment and merger activity. We believe that the quest to incorporate additional technologies, offer enhanced services, and expand geographic and customer reach should continue to drive investment and M&A activity in the sector.

◆ Solutions at Hand

We believe that central to breaking the bandwidth bottleneck and providing enhanced services are numerous access technologies and market-entry strategies, each of which has attracted significant investment. Since each of these approaches solves essentially the same problem and involves numerous pros and cons, we believe it is important for investors to take a comprehensive approach to broadband connectivity and enhanced services, and not devote exclusive focus to one or the other technology or strategy.

As such, we provide in this report a primer on the following topics for investors:

Regulatory Framework: Regulation and public policy shape competition and exert considerable influence on the capital markets.

Fiber-Based Competitors: While not a new technology, the use of fiber optics in the local loop has gained considerable momentum in recent years as a premium business solution in urban areas.

Broadband Wireless Competitors: Broadband technologies are able to offer high-throughput connections for both business and residential applications, depending on the spectrum band used.

Digital Subscriber Line (DSL) Providers: DSL technology has quickly emerged as an economic solution for high-speed Internet access and remote LAN connections. Because it leverages the existing copper plant that passes nearly all businesses and residences, DSL services can be tailored for multiple market segments.

Cable-based Broadband Providers: By upgrading (or overbuilding) existing networks, cable operators and ISPs have developed a powerful platform for delivering high-speed Internet services to the 90%-plus of households that are passed by the cable plant.

Building-Centric Service Providers: This category of provider targets the highly concentrated user base located within multi-tenant buildings. It includes the four vertical sub-sectors of multi-tenant commercial buildings; multi-dwelling residential units; hotels; and public access in airports, convention centers, and the like.

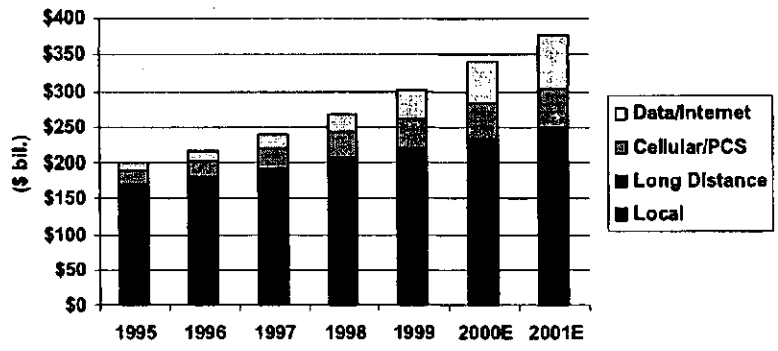
Smart-Build Providers: This category includes firms with **hybrid approaches** to technology and market entry that focus on solutions, as opposed to raw bandwidth.

Section 2:
The Broadband Opportunity

Data is the fastest growing segment of the $250 billion telecom services sector.

According to the FCC and industry sources, U.S. telecommunications service revenue, including traditional voice and data services, exceeded $250 billion in 1999. During the latter half of the 1990s, the industry's 10% compound annual growth nearly doubled the rate of the first half of the decade. Data-related revenues are growing at approximately triple the rate of the overall industry, creating tremendous opportunities for competitors and incumbents alike. Although much of this improvement can be attributed to increased competition as well as the growth of the Internet, we expect broadband access and enhanced services to drive future growth at these levels or higher.

Exhibit 2-1 ◆ United States Telecom Service Revenues



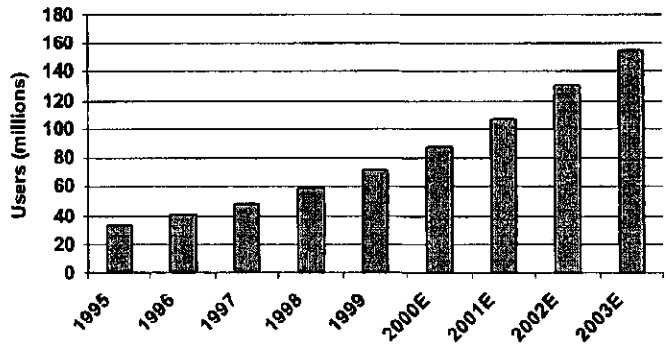
Source: FCC, and Dain Rauscher Wessels estimates

◆ Internet Growth Should Fuel Further Expansion

Affordable, available broadband access should accelerate Internet growth.

While it took television 13 years to reach the 50 million user level, it took only four for the Internet. This tremendous growth occurred while the industry has been largely reliant on slow-speed, analog lines. Today the Internet counts some 90 million residential users in the United States alone, and Internet services revenues have grown at more than 30% CAGR over the last five years with no slowdown in sight. Once access to the Web becomes as convenient as turning on a television—a real possibility if the services we examine in this report live up to their potential—we believe the opportunities will accelerate.

Exhibit 2-2 ◆ United States Residential Internet Growth



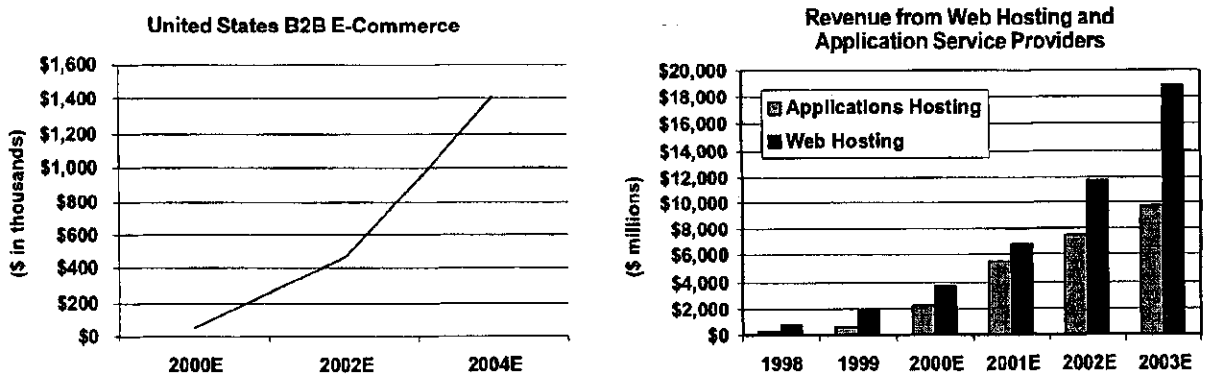
Source: Strategis Group

Broadband access drives further growth.

With a wider user community comes the opportunity to provide a broader set of products and services. Further, as bandwidth becomes more affordable and widely available, the types of applications provided over the Internet are expected to expand. According to a study by Mercer Management Consulting, people with high-speed access search for information and make purchases online at approximately double the rate of those with lower-speed analog modems. This is not a surprising conclusion given the meaningful reduction in transmission speeds achievable with broadband technology.

Yet, while much attention has focused on consumer online purchases, the potential of the Internet to affect the way businesses operate is far more significant as they utilize this technology for internal communications, coordination with customers and suppliers, business exchanges, inventory and supply-chain management, enterprise resource planning, and other applications. Forrester Research predicts that business-to-business e-commerce will grow at more than 125% on a compounded annual basis, from approximately $54 billion this year to more than $1.4 trillion in 2004. Of note, no less than five separate industry vertical segments are expected to generate more than $100 billion in e-commerce revenues by 2004. Such widespread usage of data-intensive applications should further drive demand for bandwidth and for Internet outsourcing services such as applications hosting, which is projected to grow into a $10 billion market by 2003, and Web hosting, which is projected to grow to nearly $20 billion during that time frame.

Exhibit 2-3 ◆ Business Internet Trends



Source: DataQuest and Forrester Research

According to IDC, small and medium-sized businesses are expected to account for more than 75% of the Internet hosting opportunity. This is a significant finding because SMBs are one of the primary markets targeted by competitive broadband providers (see following section entitled "Small and Medium-Sized Business Market"). As described in later sections, broadband carriers are rapidly adding hosting to their voice and data service bundles.

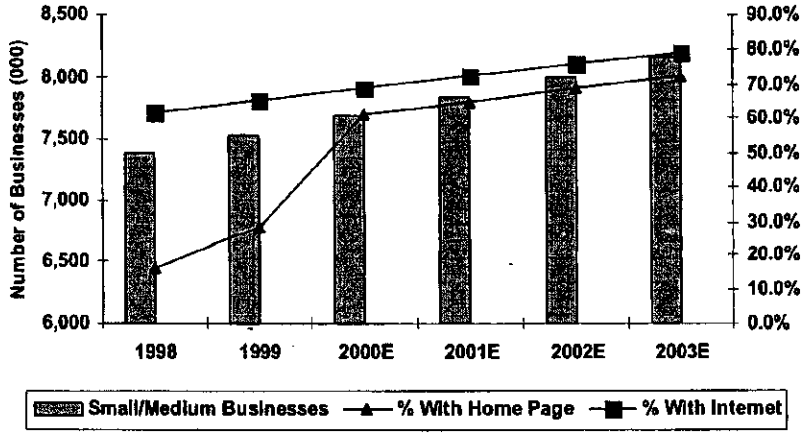
◆ Small and Medium-Sized Business Market

Even businesses are hamstrung by current local access speeds.

Broadband Internet access and wide-area data networks are neither widely used nor widely available today at affordable rates. Among businesses using the Internet, 57% have only simple dial up access over a modem that, at best, offers speeds of 56 kbps. Removing this bottleneck presents a tremendous opportunity for local carriers able to offer broadband connections at economical price points.

The market opportunity presented by the small and medium-sized business (SMB) segment is particularly attractive for competitive providers. In terms of overall size, there are an estimated 7.4 million businesses in the SMB segment, according to IDC. Collectively, these businesses generate approximately $58 billion in telecommunications spending per year. Yet incumbent service providers have typically overlooked the SMB market, due in large part to greater operating efficiencies associated with serving enterprise customers.

Exhibit 2-4 ◆ Small and Medium-Sized Business Internet Use

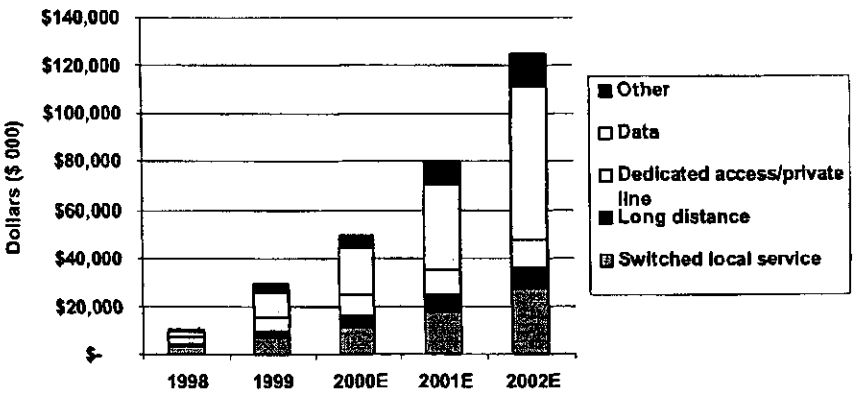


Source: International Data Corporation (IDC)

Considering that competitive providers collectively served well under 10% of the SMB market and that they are generally able to offer more customized services than the incumbent provider, it is no surprise that they continue to find few barriers to displacing the incumbent and gaining market share. We believe that broadband access, which fewer than 10% of SMBs use today but more than 40% are forecasted to use by 2003 (not to mention broadband-enhanced services such as hosting and network-delivered applications), will fuel even greater competitive success in the coming years. We think that incumbent efforts, meanwhile, will likely stay focused on the residential and large enterprise segments.

All told, we expect revenue growth by competitive providers to approximate 85% CAGR over the next three years, with data accounting for roughly 125% annual growth. In dollar terms, this translates to $125 billion by 2002, accounting for only about 15% of the overall market at that time.

Exhibit 2-5 ◆ Competitive Local Exchange Provider Revenue Growth Trends



Source: New Paradigm Resources Group

We expect the following factors to contribute to and supplement the core broadband business opportunity addressed in **Exhibit 2-5**:

- **Telecommuting:** The nation's 30-plus million teleworkers offer strong opportunities for broadband service providers because of the large number of users, their relative insensitivity to price compared to consumers, and the proximity of many residences to high-speed infrastructure (both the cable and copper plants pass most homes).
- **Small Branch Offices:** Today, 80% of the 1.5 million U.S. enterprise locations can be classified as small or branch offices with six to 75 employees (Gartner Group). Branch offices typically need connectivity to the corporate network and are willing to pay a premium for high-speed access.
- **Enhanced Services Bundle:** SMBs are looking not just for high-speed access or advanced voice services. Increasingly they want to be able to use the same tools available to large businesses and are seeking out enhanced services such as Web site development and hosting, outsourced enterprise applications, and network and IT support. To varying degrees, each of the business models profiled in this report targets the enhanced services bundle as a way to continue to generate sustainable, high-margin revenue growth.

Section 8:
Building-Centric Service Providers (BSPs)

Section 8: Building-Centric Service Providers (BSPs)

Broadband services are becoming a key component of value for commercial and residential properties. As real estate stakeholders rush to meet the demands of commercial and residential tenants, carriers are stepping up to the plate with a new generation of convergence products, engineered to distribute voice, data, and enhanced services to multi-tenant properties. Recently, a new crop of broadband service providers has emerged to meet tenant demand for building-focused broadband services. Although the term "BLEC" is occasionally used to identify these carriers, we prefer to use the term BSP (building-centric service provider), as there is no requirement these companies carry LEC (local exchange carrier) status.

Fueling the BSP trend are the incentives that real estate owners have to increase property values and to take advantage of more favorable REIT (real estate investment trust) regulations through equipping their properties with broadband facilities. This is evidenced by the numerous REITs and REOCs (real estate operating companies) that have announced broadband initiatives. The BSP strategy is to offer high-speed Internet access (and, in some cases, voice services), data networking, Web hosting, and enhanced services such as e-commerce and network-delivered applications to multi-tenant and/or hospitality properties.

This approach is similar to that taken by other competitive providers; however, it differs in execution due to the BSPs' strategic relationships with property owners, and the "pre-provisioned" nature of service installation (no truck roll required) to individual suites. In addition, as distinct from many other local competitors, BSPs often lease rather than construct much of their last-mile and backbone infrastructure (at least initially).

Multi-tenant unit (MTU) office properties are an obvious potential market for the BSPs; however, significant opportunities extend into additional types of real estate, such as multi-dwelling unit (MDU) residential properties, hotels, and public access environments. In this chapter, we consider four vertical markets targeted by BSPs:

- multi-tenant commercial properties (or MTUs, multi-tenant units);
- multiple-dwelling units (MDUs);
- lodging; and
- public access (airports, convention centers, and so forth) for business travelers.

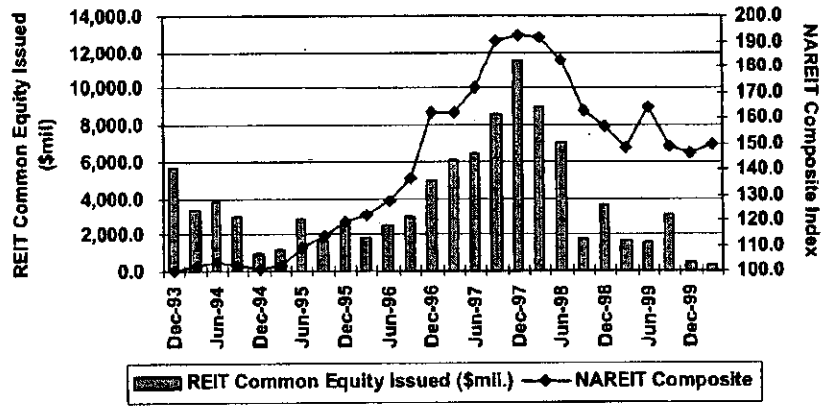
We recognize that the dividing line between these segments is occasionally blurred, and in fact many companies in this emerging sector are addressing multiple segments. In addition, not to be overlooked is the fact that many fiber-based and broadband wireless competitors (such as Intermedia Communications, Inc. (Nasdaq: ICIX; Not Rated) Time Warner Telecom, NEXTLINK Communications, Inc., WinStar Communications, Teligent, and Advanced Radio Telecom) have significant building-centric elements to their business models. Nevertheless, as we describe below, BSPs have several common features in their business models that distinguish them from these other classes of competitor and that warrant treating them as a separate category.

◆ A Brief Primer on Real Estate

Real estate development is a complex business, with numerous entitlement processes, financial partners, public agencies, private entities, and management teams to deal with. Combined, these factors present a formidable barrier to competitive providers who wish to serve this market. As discussed in Section 3, the 1996 Telecommunications Act prohibits exclusive service agreements between broadband providers and real estate developers in commercial buildings. However, service providers and developers are frequently willing to enter into exclusive or preferred marketing deals. The following discussion highlights some of the events that have helped create the current opportunity for building-centric broadband service providers.

Despite strong tenant demand, the real estate market became increasingly competitive in the late 1990s, largely due to an increase in supply in most property sectors. As access to capital became tight for property owners, property-level revenues (as opposed to acquisitions) were the primary source of earnings growth for most property owners. Given this circumstance, coupled with greater tenant demand for broadband services, the role of the commercial real estate owner evolved in a new direction. REITs, as well as public and private real estate operating companies (REOCs), embraced telecom as a means to further enhance property values and tenant retention.

Exhibit 8-1 ◆ REIT Total Returns and Common Equity Issued



Source: National Association of Real Estate Investment Trusts

Broadband Deployment: More favorable REIT regulations helped spur broadband deployment. In January 1999, Equity Office Properties Trust, an office REIT, received a ruling from the IRS that allowed the company "to participate in the delivery of advanced telecommunication services to its customers without violation of current REIT rules." According to the ruling, revenue generated by Equity Office from telecommunication services would be deemed "rents from real property." By way of background, REITs must derive at least 75% of gross income from rents from real property, interest on mortgages on real property, or dividends from REIT shares. More recently, the REIT Modernization Act (RMA), passed in December 1999, provides REITs with greater latitude to generate income that is not derived from "rents on real property." Simply put, REITs can more aggressively provide non-core services to tenants without jeopardizing their REIT status.

Section 8: Building Service Providers (BSPs)

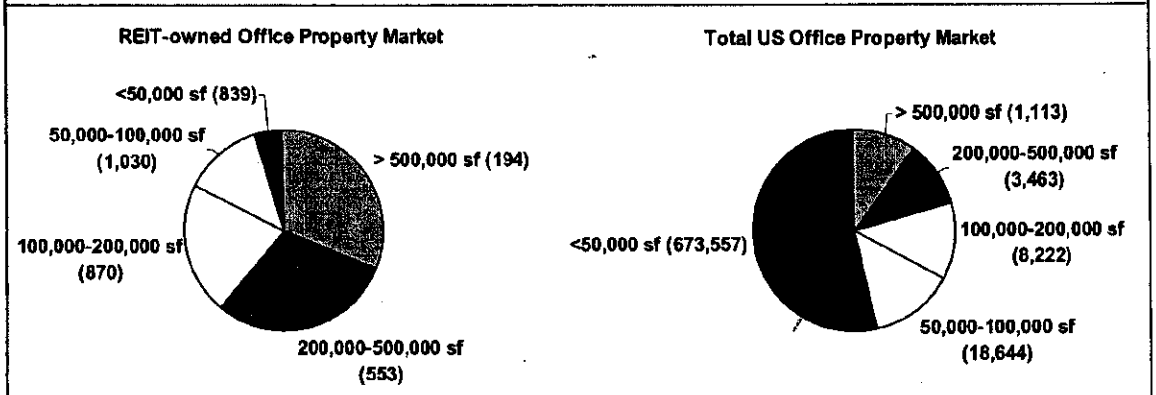
The Land Grab for Building Access: Prior to deploying an in-building broadband network, a BSP must secure access rights from the real estate owner in order to install and operate the proprietary networking equipment. The typical license and access agreement has an initial term ranging from five to ten years, with five- to fifteen-year renewal options. These agreements may also provide for a marketing arrangement, in which the property owner recommends the BSP's telecommunication services to existing or prospective tenants. Typically, BSPs target property interests, such as REITs, REOCs, property managers, real estate agents, as well as pension funds and insurance companies that own commercial real estate to form strategic relationships. These relationships have often included BSP warrant issuances to the property interests in exchange for building access rights.

Although building access rights initially create a captive pipeline for BSPs to install their in-building network, the onus is on the BSP to install its network on a timely basis, since other BSPs are likely to have building access rights, given the non-exclusive nature of most agreements. For instance, hotel operators, such as Marriott International and Hilton Hotels, often do not own all of their branded-properties. Therefore, separate agreements with the property owner may be necessary, despite being the preferred high-speed access provider of a hotel chain. We outline several major BSP-real estate relationships in the following sections of this report, organized by vertical market segment.

◆ Multi-Tenant Unit (MTU)—Office BSPS

Traditional telecommunication service providers have typically overlooked small and medium-sized businesses that are located in MTUs. According to the U.S. Department of Energy, the commercial office market consists of approximately 705,000 properties, totaling 10.5 billion square feet. Based on the U.S. Department of Energy and SNL Securities, we conservatively estimate that there are close to 32,000 commercial office properties in the U.S. larger than 50,000 square feet. All told, this adds up to an estimated market opportunity on the order of $10 billion. To address the need for broadband services, BSPs install their own in-building infrastructure and attempt to be a complete provider of bundled services.

Exhibit 8-2 ◆ National Commercial Office Market



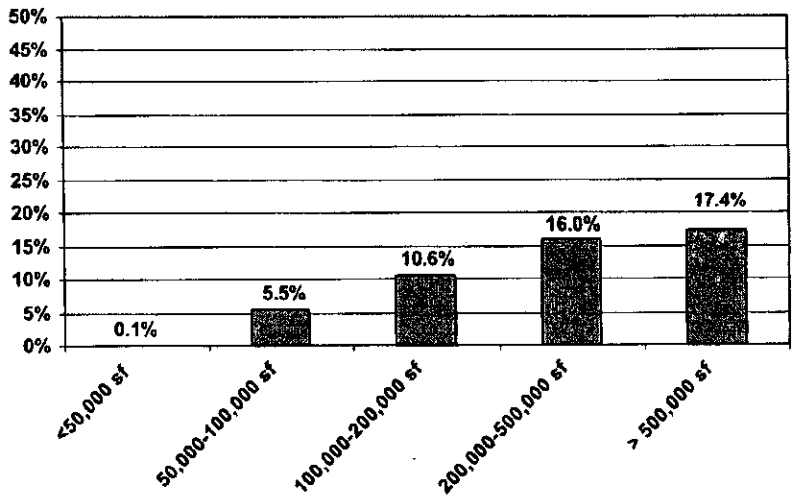
Note: Parenthetical figures refer to estimated number of buildings within each category.

Source: Dept. of Energy and Dain Rauscher Wessels

Source: Dain Rauscher Wessels estimates

In order to deploy their in-building networks, we believe that many BSPs are more likely to initially target office buildings greater than 50,000 square feet, given the economies of scale that larger properties afford. Accordingly, we believe that their strategic relationships with commercial real estate owners create a captive pipeline for BSPs in a relatively attractive segment of the commercial real estate market. As illustrated in **Exhibit 8-3**, REIT portfolios consist of larger properties relative to the national office market. Overall, we estimate that REITs own approximately 0.5% of total U.S. commercial office properties, representing 5.4% of total square footage. More specifically, we estimate that REITs own significantly less than 1% of properties with less than 50,000 square feet; meanwhile. This ownership increases to 16.0% and 17.4% of commercial office buildings that encompass 200,000-500,000 square feet and over 500,000 square feet, respectively. We believe the significance of the BSP relationships would be even more evident if the real estate portfolios of several of the major REOCs, such as Tishman-Speyer, Fisher Brothers, TrizecHahn, and Trammel Crow were considered; however, much of this data was unavailable during our analysis.

Exhibit 8-3 ◆ REIT Ownership as a Percentage of the Total U.S. Office Market



Source: Dain Rauscher Wessels

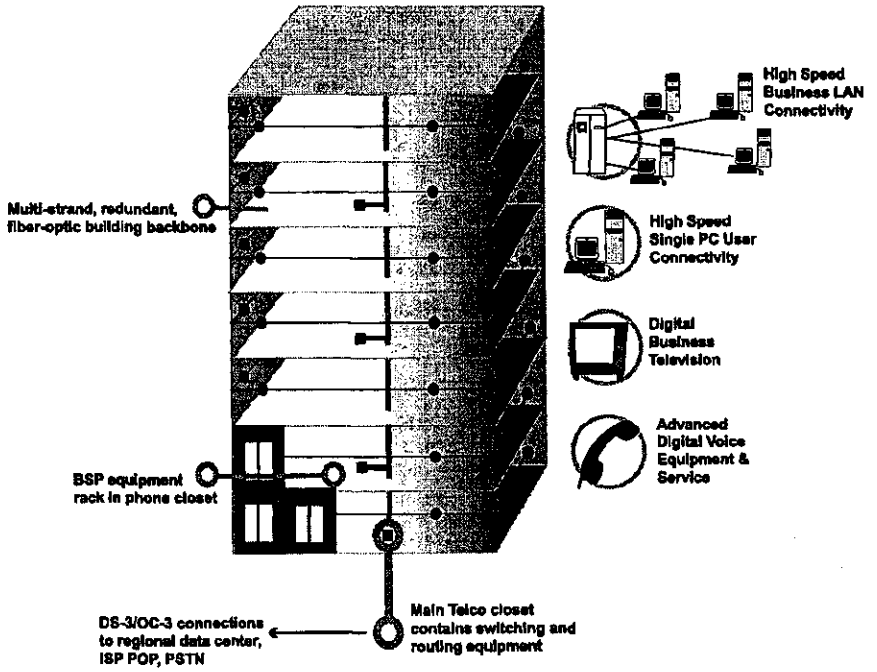
Typical Building-Centric Network Architecture: Although currently available "last-mile" technologies can deliver high-speed data from a local central office to the edge of the building, this does not fully solve the issue of competitive access to tenants inside a commercial building. Traffic must still move from the edge of the building to an end user's LAN, PBX, telephone, or PC over the building's internal network, Historically competitive providers have connected building tenants to their networks by way of the existing in-building wiring, often constructed and owned by the ILEC, through a network interface device typically located in the building basement.

As a result of numerous factors, including:

- the bandwidth limitations frequently found in existing in-building wiring;
- the desire to provide network control all the way to the tenant site and not rely on third-party facilities in the building; and
- the desire to offer bundled voice, data, Internet, hosting, and other services;

BSPs install their own telecommunications equipment in the basement phone closet and either speed up the existing copper connections using DSL technology, or run their own combination of fiber, coaxial cable, and clean copper through the building's vertical utility shafts (referred to as "risers") to reach individual business tenants. This is illustrated in **Exhibit 8-4**.

Exhibit 8-4 ◆ Typical BSP Network for Multi-Tenant Commercial Buildings



Source: Dain Rauscher Wessels

The basement point of presence (POP) is customized according to the BSP's specific needs and contains data networking and voice communications (depending on the carrier) equipment as well as primary and back-up power supplies. These features allow the BSP to manage in-building networks and facilities independent of the ILEC. The copper, coaxial, and/or fiber-optic cabling installed in the served buildings extends from the basement POP to a termination block on each floor. When a tenant on a particular floor requests service, a technician extends a connection from the floor termination block to the business premise. Having each tenant essentially pre-provisioned eliminates costly service installation procedures such as truck rolls.

BSPs usually outsource in-building construction to contractor partners. The time required to deploy a building network can range from approximately two weeks to two months, depending on the size and type of property as well as the capital intensity of the BSP's network model. As noted earlier, some BSPs choose to utilize existing building copper and enhance it using DSL, while others choose to run their own cabling through the risers. Accordingly, deployment expenditures per building can vary widely, from roughly $30,000 to more than $200,000. In general, carriers use the "DLSAM in the basement" approach to achieve a more rapid time to market or to target buildings with a smaller tenant base.

To communicate with the PSTN, Internet, or other networks, the BSPs connect their building POPs via high-capacity lines (usually leased from a LEC) to a telco central office or metro-area data center, depending on the nature of the traffic. BSPs that do not operate their own hosting or wide-area network infrastructure provide these services on a private-label basis.

Strategic Partnerships for Building Access: Before wiring a building, BSPs must enter into agreements with property owners and operators to gain access rights. Examples of the many strategic agreements that have been reached between BSPs and real estate groups are shown in **Exhibit 8-5.**

Exhibit 8-5 ◆ BSP-Real Estate Partnerships in the Multi-Tenant Office Sector

BSP	Real Estate Partners/Strategic Alliances	Company Type
Allied Riser	Angelo, Gordon & Co.	Office Property Manager
	Amerimar Enterprises	Office Property Manager
	Berwind Property Group	Diversified Property Owner
	Boston Properties	Office REIT
	Cornerstone Properties *	Office REIT
	Equity Office Properties Trust	Office REIT
	Fisher Brothers	Office Property Owner and Manager
	Hamilton Partners	Office Property Owner and Manager
	The Hines Organization	Office Property Owner and Manager
	Leggat McCall Properties LLC	Office Property Owner and Manager
	MetLife	Office Property Owner and Manager
	Minshall Stewart Shelby and Co.	Diversified Property Owner
	Pope and Land Enterprises, Inc.	Office Property Developer
	Rubenstein and Company, LP.	Commercial Real Estate Service Provider
	Shorenstein Company	Commercial Real Estate Service Provider
	Tishman Speyer	Office Property Owner and Manager
	Transwestern	Office Property Owner and Manager
	TrizecHahn Corporation	Office Property Owner and Manager
	Urdang & Associates Real Estate Advisors, Inc.	Commercial Real Estate Service Provider
	Vornado Realty Trust	Office/Retail REIT
	Whitehall Funds	Diversified Property Owner
Broadband Office	CarrAmerica Realty Corporation	Office REIT
	Crescent Real Estate Equities	Office REIT
	Duke-Weeks Realty Corp.	Office REIT
	Equity Office Properties Trust	Office REIT
	Highwoods Properties, Inc.	Office REIT
	The Hines Organization	Office Property Owner and Manager
	Mack-Cali Realty Corporation	Office REIT
	Spieker Properties, Inc.	Office REIT
Cypress Communications	Aldrich, Eastman and Waltch	Diversified Property Investor
	Boston Properties	Office REIT
	Brookfield Properties	Office Property Owner and Manager
	Boxer Property	Office Property Owner and Manager
	Cornerstone Properties *	Office REIT
	Cousins Properties	Office REIT
	Lend Lease	Commercial Real Estate Service Provider
	Pope & Land Enterprises, Inc.	Office Property Developer and Manager
	Shorenstein Company	Commercial Real Estate Service Provider
	Taylor & Mathis, Inc.	Office Property Manager
	Taylor Simpson	Commercial Real Estate Service Provider
	Tower Realty	Office REIT
	Transwestern	Office Property Owner and Manager
	TrizecHahn Corporation	Office Property Owner and Manager
	Vornado Realty Trust	Office/Retail REIT
Darwin Networks	MacFarlan Real Estate	Office Property Owner and Manager
	Koulter Property Management	Office Property Owner and Manager
eLink Communications	Jones Lang LaSalle	Commercial Real Estate Service Provider
	TrizecHahn Corporation	Office REOC
Eureka Broadband	Arden Realty, Inc.	Office REIT
	Max Capital Management	Office Property Owner and Manager
Everest Broadband Networks	Cohen Brothers Realty Corp.	Office Property Owner and Manager
	Muss Development Company	Office Property Owner and Manager

* Cornerstone Properties is being acquired by Equity Office Properties Trust.

Source: Company reports and Dain Rauscher Wessels

Exhibit 8-5 ◆ BSP-Real Estate Partnerships in the Multi-Tenant Office Sector, continued

BSP	Real Estate Partners/Strategic Alliances	Company Type
Eziaz	Berwind Property Group	Diversified Property Owner
	Catellus Development	Diversified Property Owner and Manager
	DLJ Real Estate Capital Partners	Diversified Property Owner
	Glenborough Realty Trust	Office, Hotel and Multi-Residential REIT
	Insignia Financial Group	Commercial Real Estate Service Provider
	The Irvine Company	Master Planned Community Developer
	Jones Lang LaSalle	Commercial Real Estate Service Provider
	Koll Development Company	Diversified Property Developer
	Layton-Belling	Commercial Real Estate Service Provider
	Olen Properties	Office and Multi-Residential Property Owner
	Paramount Group	Commercial Real Estate Service Provider
	Parkway Properties	Office REIT
	PM Realty Advisors	Commercial Real Estate Service Provider
	RM Crowe Property Management	Office/Residential Property Owner and Manager
	Rubenstein and Company, LP.	Commercial Real Estate Service Provider
	SKB	Commercial Real Estate Service Provider
	Taylor Simpson Group	Commercial Real Estate Service Provider
	Tishman Speyer	Office Property Owner and Manager
	Vornado Realty Trust	Office/Retail REIT
	JMB/Walton Street Capital	Diversified Property Investor
Fibernet Telecom Group	Tishman Speyer	Office Property Owner and Manager
Intellispace	Abramson Brothers Incorporated	Office Property Owner and Manager
	ATCO Properties and Management	Office Property Owner and Manager
	Bernstein Real Estate	Office Property Owner and Manager
	Brause Realty	Office Property Owner and Manager
	Cushman and Wakefield	Commercial Real Estate Service Provider
	Dakota Realty	Office Property Owner and Manager
	Falcon Properties	Office Property Owner and Manager
	GVA Williams	Office Property Owner and Manager
	Helmsley-Spear	Office Property Owner and Manager
	Jeffrey Management	Office Property Owner and Manager
	Jones Lang LaSalle	Office Property Owner and Manager
	Justin Management	Office Property Owner and Manager
	The Lincoln Building	Office Property Owner and Manager
	Max Capital Management	Office Property Owner and Manager
	Olympic Tower Associates	Office Property Owner and Manager
	Orda Management	Office Property Owner and Manager
	Rudin Management @ 55 Broad Street	Office Property Owner and Manager
	Sherwood 1600 Associates	Office Property Owner and Manager
	Taconic Investment Partners	Diversified Property Investor
	Tower 49®	Office Property Owner and Manager
	W and M Properties	Office Property Owner and Manager
	W and M Properties of Connecticut	Office Property Owner and Manager

Source: Company reports and Dain Rauscher Wessels

Exhibit 8-5 ◆ BSP-Real Estate Partnerships in the Multi-Tenant Office Sector, continued

BSP	Real Estate Partners/Strategic Alliances	Company Type
OnSite Access	Angelo, Gordon & Co.	Office Property Owner and Manager
	Blumberg & Freilich Equities Properties	Office Property Owner and Manager
	Brannen Goddard Co.	Office Property Owner and Manager
	The Brookdale Group LLC	Office Property Owner and Manager
	Childress Klein Properties	Office Property Owner and Manager
	Cummings Properties	Office Property Owner and Manager
	Devnet	Commercial Real Estate Service Provider
	Emmes Realty Services	Commercial Real Estate Service Provider
	Equity Office Properties Trust	Office REIT
	Insignia Financial Group	Commercial Real Estate Service Provider
	JMB/Walton Street Capital	Diversified Property Investor
	John. K. Akridge Companies	Office Property Owner and Manager
	Legacy Partners Commercial	Commercial Real Estate Service Provider
	Lend Lease Real Estate Investments	Diversified Property Investor
	Newmark & Co. Real Estate, Inc.	Office Property Owner and Manager
	Oxford Properties Group Inc.	Office Property Owner and Manager
	The Parmenter Company	Office Property Owner and Manager
	Praedium Funds	Diversified Property Investor
	Prime Group Realty	Office REIT
	Reckson Associates	Office REIT
	Regent Partners	Office Property Owner and Manager
	SL Green Realty	Office REIT
	Starwood Capital Group Properties	Diversified Property Owner and Manager
	The Taylor Simpson Group	Commercial Real Estate Service Provider
	Tishman Speyer	Office Property Owner and Manager
	TMW Real Estate Group	Office Property Owner and Manager
	Tower Realty Management Corp.	Office Property Manager
	Transwestern	Office Property Owner and Manager
	TrizecHahn Corporation	Office Property Owner and Manager
	The Witkoff Group	Office Property Owner and Manager
Tenant Connect	Arden Realty	Office REIT
Urban Media	Jones Lang LaSalle	Commercial Real Estate Service Provider
	Liberty Property Trust	Office REIT
	Pinnacle Properties	Office Property Owner and Manager
	Prentiss Properties Trust	Office REIT
	Trammell Crow Company	Office Property Owner and Manager

Source: Company reports and Dain Rauscher Wessels