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Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
445 12th Street, S.W.
12th Street Lobby, TW-A325
Washington, DC 20554

Re: Ex Parte Presentation in WT Docket No. 99-217 and CC Docket No. 96-98

Dear Ms. Salas:

On behalf of Winstar Communications, Inc., this afternoon I provided to Lauren Van Wazer of the Wireless Telecommunications Bureau copies of the following articles and documents:

1. Barbara Martinez, *"It Adds Up to More Than Just Semantics,"* The Wall Street Journal (March 15, 2000);
2. Scott Thurm and Barbara Martinez, *"Big Landlords Are Joining Telecom Fray,"* The Wall Street Journal (October 5, 1999);
3. Janet Morrissey, *"Six REITs Are Joining Forces To Form Broadband Company,"* The Wall Street Journal, (July 11, 2000);
4. "Wired Real Estate: The Ultimate Portal; Valuing Real Estate Assets in the New Economy," by Amy Young, Evelyn Leon-Infurna, Michael Carrier and Joseph Rizzi, Jr. of Deutsche Bank Alex. Brown (May 15, 2000);
5. "Bullish on Broadband: An Investor's Guide to Competitive Service Providers," by Jonathan Atkin and David Coleman of Dain Rauscher Wessels (June 8, 2000);
6. "Multi-Tenant Broadband Service Providers: High in the Sky?" Data Communications Report, Vol. 15, No. 6 by The Yankee Group (April 2000); and
7. "Emerging Telecom & Internet Infrastructure Conference," by Goldman Sachs High Yield Research (June 2000).

Because the articles and documents relate to a rulemaking pending before the Commission, in accordance with the Commission's rules, for each of the above-mentioned proceedings, I hereby submit to the Secretary of the Commission two copies of this notice of Winstar's written ex parte presentation.

Respectfully submitted,

Gunnar D. Halley
Counsel for WINSTAR COMMUNICATIONS, INC.

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cc: Lauren Van Wazer (WTB)

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DAIN RAUSCHER WESSELS A DIVISION OF DAIN RAUSCHER INCORPORATED

EQUITY CAPITAL MARKETS ◆ INSTITUTIONAL RESEARCH

Bullish on Broadband

An Investor's Guide to Competitive Service Providers

Summary Themes

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. We believe that 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.

Broadband Services

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June 8, 2000

DAIN RAUSCHER WESSELS
EQUITY CAPITAL MARKETS

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Public Companies Mentioned in this Report

Adelphia Business Solutions	ABIZ	FirstWorld Communications	FWIS	NorthEast Optic Network	NOPT
Advanced Radio Telecom	ARTT	Focal Communications	FCOM	Northpoint Communications	NPNT
Allegiance Telecommunications	ALGX	High Speed Access Corp.	HSAC	Nucentrix Broadband Networks	NCNX
Allied Riser Communications	ARCC	iBeam	IBEM	Pac-West Telecomm	PACW
Broadwing	BRW	ICG Communications	ICGX	RCN Corporation	RCNC
CAIS Internet	CAIS	Intermedia Communications	ICIX	Rhythms NetConnections	RTHM
CapRock Commuications	CPRK	Internet America	GEEK	SoftNet Systems	SOFN
Choice One	CWON	ITC^DeltaCom	ITCD	TALK.com	TALK
Convergent Communications	CONV	Log On America	LOAX	Teligent	TGNT
Covad Communications	COVD	McLeodUSA	MCLD	Telocity	TLCT
CTC Communications	CPTL	Metromedia Fiber Networks	MFNX	Time Warner Telecom	TWTC
Cypress Communications	CYCO	Mpower Communications	MPWR	Universal Access	UAXS
DSL.net	DSLN	Net2000 Communications	NTKK	US LEC Corp.	CLEC
eLEC Communications	ELEC	Netlojix	NETX	Williams Communications Group	WCG
Electric Lightwave	ELIX	Network Access Solutions	NASC	WinStar Communications	WCII
Excite@Home	ATHM	Network Plus Corp.	NPLS	Worldgate Communications	WGAT
FiberNet Telecom Group	FTGX	NEXTLINK Communications	NXLK	Z-Tel Technologies	ZTEL

Private Companies Mentioned in this Report

@Link Networks	CoreExpress	iSky	Picus Communications
2nd Century Communications	Darwin Networks	Jato Communications	PointOne Telecommunications
Actel Integrated Communications	Digital Access, Inc.	KMC Telecom	Prism Communication Services
AERIE Networks	Digital Broadband Communications	Knology	ReFlex Communications
America's Fiber Network	Edge Connections	LightNetworks	Road Runner
Arrival Communications	eLink Communications	LighTrade	Seren Innovations
ATG Group	Enron Broadband Services	LMA Systems	Skyway Partners
AuraServ Communications	Eschelon Telecom	Logix	SmartPipes
B2B Connect	Eureka Broadband	Maverix.net	SPEEDUS.COM
Birch Telecom	Everdream	Millennium Optical Networks	STSN
BlueStar Communications	Everest Broadband Networks	MobileStar Network	Switch & Data Facilities
Broadband Office	Extant	Netbeam, Inc.	TelePacific
Broadband Residential	EZ Net	NETtel Communications	Telseon
BroadbandNOW	Eziaz	Network Telephone	Tenant Connect
BroadlLink Communications	Fiberlink Communications Co.	New Edge Networks	TeraBeam Networks
Broadslate Networks, Inc.	Flashcom	NewSouth Communications	Touch America
BTI Telecom	Florida Digital Network	OneNetPlus.com	TriVergent Communications
Carolina Broadband	Fuzion Wireless Communications	OnePoint Communications	Urban Media
Cbeyond Communications	Gabriel Communications	OnSite Access	Vectris Communications
Centerbeam	Global Broadband	Onvoy	Vitts Networks
Cidera	HarvardNet	PaeTec	Wayport
Clearwire Technologies	HighSpeed.com	Pathnet	Western Integrated Networks
Cogent Communicationws	Integra Telecom	PF.Net	WideOpenWest
Colo.com	InterAccess	Phatpipe	Wired Business
ColoSolutions	Internet Connect	Phoenix Networks	Yipes Communications, Inc.
ConnectSouth	IP Communications	Phonoscope Communications	Zyan

Section 1:
Executive Summary and Investment Themes

Section 1: Executive Summary and Investment Themes

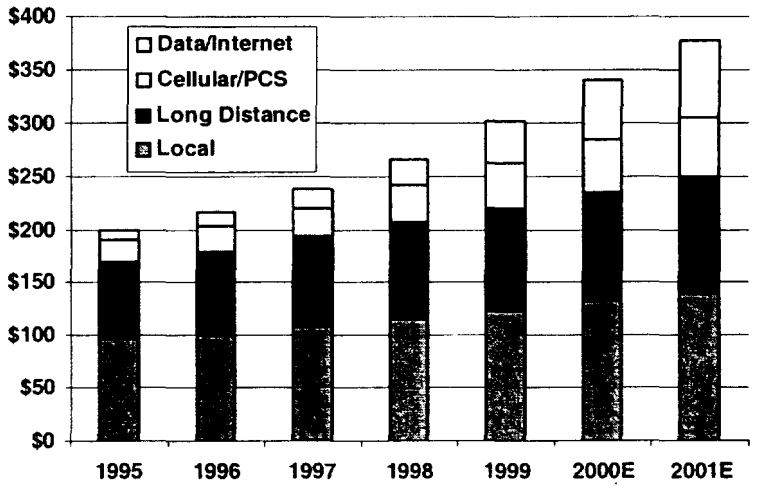
◆ The Market Opportunity

The market opportunity for competitive broadband providers can be summarized in the following points:

- There exists a large market for conventional telecommunications services.
- Internet and data-related opportunities should augment this market opportunity.
- Competitors currently occupy a small share of this market and are poised to grow their share significantly.
- Small and medium-sized businesses represent a particularly attractive sector for focus by competitive providers.

Large market exists for conventional telecommunications services. In raw numbers, the market for conventional voice and data communications is greater than $250 billion. This market is growing at slightly less than 10% per year, with the data portion growing at triple this rate, or approximately 30% per year.

Exhibit 1-1 ◆ United States Telecommunications Services Revenue

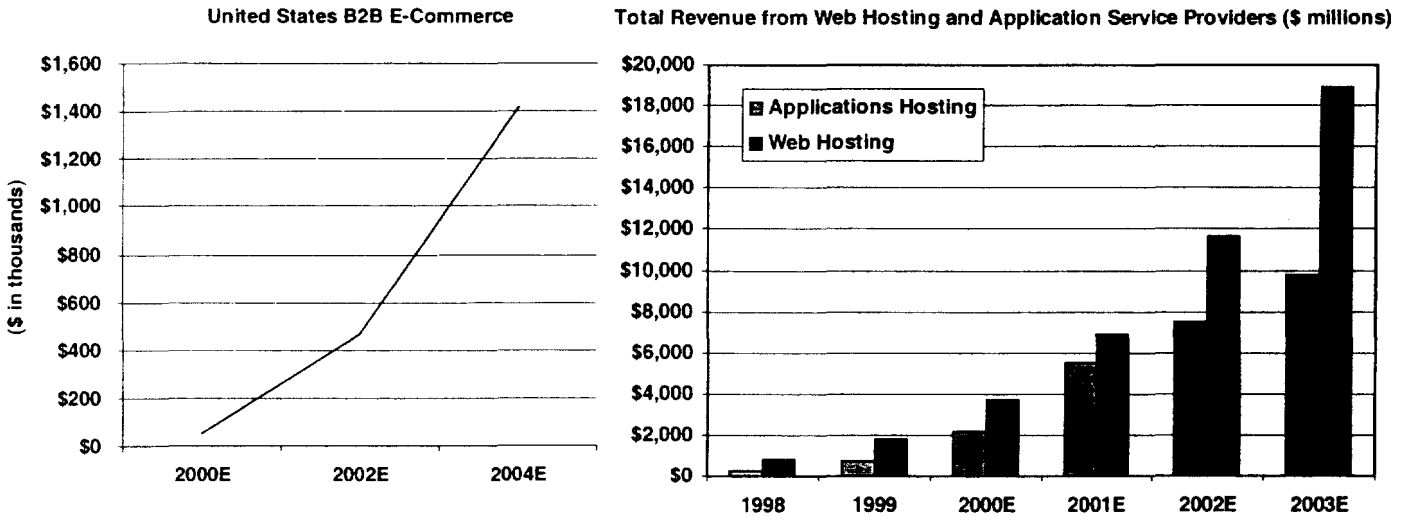


Source: FCC and Dain Rauscher Wessels estimates

Internet and data-related opportunities augment the current market. The Internet is a key driver of bandwidth demand among both businesses and consumers. New Web content and applications continue to proliferate at a rapid clip, increasing the utility and value of the Internet. On the consumer side, in addition to using e-mail to stay in touch with family and friends, individuals increasingly use the Web to conduct research, comparison shop, purchase products and services, and download content such as music and software.

Among businesses, the Internet, high-speed access, hosting, and other enhanced services are likewise gaining in popularity. Forrester Research predicts that business-to-business (B2B) 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 Web applications hosting, which are expected to grow into grow into $19 billion and $10 billion markets, respectively, by 2003.

Exhibit 1-2 ◆ Business Internet Trends

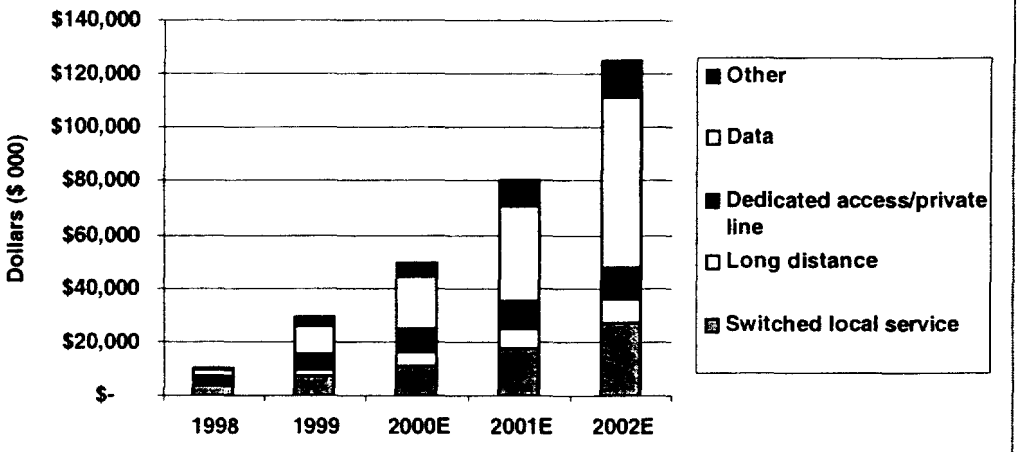


Source: DataQuest, Forrester Research, and International Data Corporation (IDC)

Competitors' share is poised to grow. Collectively, competitive providers served less than 5% of the telecommunications services market during 1999. Considering that they are generally able to offer more customized services than the slow-to-innovate, incumbent provider, competitors are finding few barriers to displacing the incumbent and gaining rapid market share. We believe that broadband access will fuel even greater competitive success in the coming years.

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 into $125 billion by 2002, accounting for only about 15% of the overall market at that time.

Exhibit 1-3 ◆ Revenue Growth Trends for Competitive Providers



Source: New Paradigm Resources Group

The sweet spot for competitors—small and medium-sized businesses. The market opportunity with 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 this 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. Removing the bandwidth bottleneck and offering enhanced services to SMBs at economical price points presents a unique and lucrative opportunity for competitive broadband providers, who are generally able to offer more targeted services than incumbent providers as well as provide more responsive customer care. As an extension to the core business market, we believe opportunities exist in non-traditional commercial settings, such as hotels, multi-dwelling units, and frequently trafficked public venues such as airports and convention centers.

◆ Multiple Broadband Technologies

Several technologies have emerged as viable broadband delivery options to businesses and residences—cable, digital subscriber line (DSL), broadband wireless, and fiber. Despite their relatively high capital intensity, each has attracted pure-play services models that feature robust market demand, attractive unit economics, and high cash-flow visibility.

Fiber: While not a new technology, the use of fiber optics in the local loop has gained considerable momentum in the last five years. Today, compared to enhancing the copper plant (DSL) or cable plant, or deploying broadband wireless equipment, fiber remains the most capital-intensive way of installing local broadband capacity. Nevertheless, the capacity of fiber far exceeds the capabilities of other transmission media. Local fiber deployment is largely restricted to business markets whose bandwidth requirements are large enough to justify the costs of deployment.

With respect to inter- and intra-city transport, several new carriers have emerged during the past five years that have pursued regional or national strategies. Often, these networks were constructed along railroad, energy pipeline, or utility rights of way, with active financial backing from entities in these other industries. Many long-haul carriers offer a mix of retail services, which are provided directly to end-users, and wholesale or carrier services, which are provided to other carriers.

Wireless: Broadband wireless technology can be deployed to offer any broadband service at throughputs ranging from DS-0 (64 kbps) to OC-3 (156 Mbps) or greater, depending on the amount of spectrum. The technology generally requires a clear line-of-sight between two transceivers and can provide voice, two-way data, or video services. At present, there are multiple spectrum bands commonly used for two-way broadband communications over the last mile.

- **Unlicensed Microwave Bands:** Unlicensed microwave spectrum has been used for several years for last-mile services. The unlicensed bands can support a variety of broadband applications and reach customers 15-20 miles or more from a given hub site, depending on the specific frequency and technology utilized.
- **2.5 GHz:** Services at this microwave frequency are commonly known as multi-channel multi-point distribution service, or MMDS. MMDS was originally licensed to provide video services but has now been authorized by the FCC for any two-way communications service. In the first half of 1999, Sprint and WorldCom each spent more than $1 billion in acquiring the MMDS licenses of several companies. Both carriers are planning multi-city rollouts of two-way broadband services to residential and small business customers during the coming quarters.
- **24 GHz/ 28 GHz/ 39 GHz Millimeter-Wave Bands:** Teligent, NEXTLINK Communications, Inc. (Nasdaq: NXLK; Not Rated), WinStar, and Advanced Radio Telecom are the major "anchor tenants" at these millimeter-wave frequencies, which are used to deliver shorter-range (2-3 miles) but higher-capacity (DS-3 to OC-3) services in metropolitan downtown areas and business parks.

Because they do not require extensive rights of way or access to incumbent-carrier central offices, broadband wireless operators can enter new markets relatively quickly. Further, independence from the incumbent provides wireless carriers with more control of their networks relative to other technologies.

Digital Subscriber Line (DSL): Digital subscriber line (DSL) technology is quickly emerging as an economic solution for high-speed Internet access and remote LAN connections. DSL technology simply upgrades the performance of existing copper lines by installing electronics at both ends of the connection. With DSL, the average analog connection of 56.6 kbps can be upgraded to 1.5 Mbps or higher.

In order to deploy their networks, DSL competitors must collocate their equipment in the incumbent carrier's facilities and lease the actual copper lines that connect to the end user. However, because DSL technology uses the existing copper plant, it is significantly less expensive to deploy on a broad scale than other approaches, such as new fiber or cable construction. In addition, since phone lines are nearly ubiquitous in the United States, DSL providers are not limited to one market segment (e.g., business or residential) as are some other access technology providers.

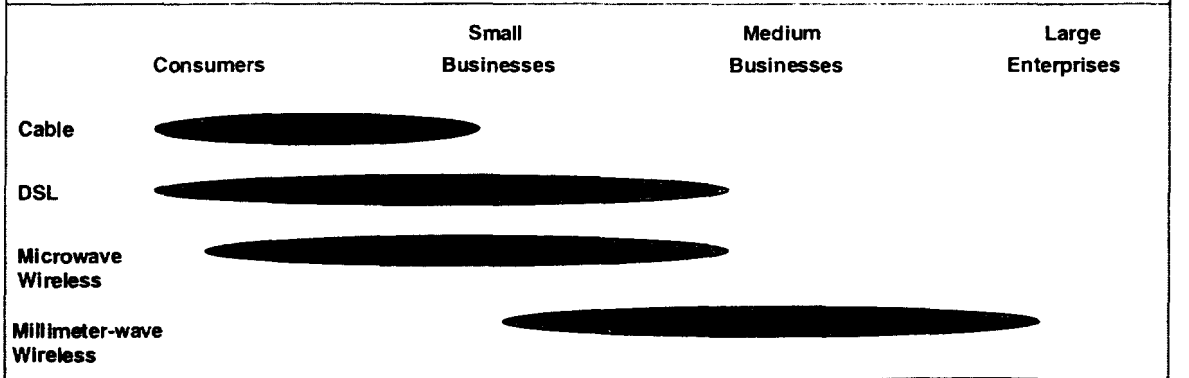
Cable (Hybrid Fiber/Coax): Aided by its conversion to digital technology as well as the growth of the Internet, the cable industry has emerged as a significant player in high-speed Internet services, especially for the residential segment. With nearly ubiquitous coverage, cable connections offer a powerful platform for providing residences and some businesses with broadband access. Leading operators in North America have formed ventures to address key technical, operating, content, and marketing challenges associated with the wide-scale deployment of cable Internet services. In addition, several cable overbuilders have emerged that are deploying state-of-the-art facilities in high-density residential markets and are offering bundled voice, video, and high-speed Internet services.

Cable Internet traffic utilizes the bandwidth of one or more analog television channels to provide downstream service from the Internet to the customer. This allows for a shared downstream bandwidth of between 27-39 Mbps, split between however many subscribers are served off a particular node. Upstream bandwidth usually exceeds analog speeds but is rarely greater than 500 kbps.

Overall Technology Perspective: Each technology has its strengths and weaknesses, and at these services' relatively early stage of commercialization, it is less a question of which technology will win than a question of how much share each will gain in the various market segments (enterprise vs. small business vs. residence, urban vs. suburban vs. exurban, national vs. regional vs. local). We believe that specialists in DSL, cable, wireless, and fiber can all gain significant share in their respective areas of strength and generate sustained value, as can companies that possess an array of technologies with which to address the local bottleneck.

Exhibit 1-4 provides a comparison of the various broadband technologies that have been commercially deployed as well as their target markets.

Exhibit 1-4 ◆ Broadband Technology Comparison



Source: Dain Rauscher Wessels

Given that these technologies are in many respects complementary, it is not surprising that many carriers are embarking on multiple facilities-based approaches and adopting a hybrid strategy. Two examples of this are NEXTLINK Communications and Adelphia Business Solutions, each of which holds LMDS spectrum in addition to fiber assets in its markets and is deploying DSL capabilities. In many other cases, carriers are choosing to partner with one another to expand their reach—examples include Intermedia Communications' partnership with Rhythms to provide DSL-based services, and Rhythms' strategic relationship with Excite@Home (Nasdaq: ATHM; Buy-Speculative; $20.50) to supplement that carrier's cable assets. We believe the future convergence of services will be fueled by the continued deployment of packet-switch architectures that are able to accommodate multiple types of traffic—this contrasts with many current deployments that utilize packet switches for data traffic and circuit switches for carrier-class voice traffic.

◆ Multiple Market-Entry Approaches

In keeping with our thesis that the strength of a services business does not rest with its technology alone, but rather with the quality of the solution that it is able to deliver to its end users, we believe it makes sense to consider additional categories of providers that are not as readily characterized by technology, namely smart-build providers and broadband facilitators.

Smart-build strategy accelerates time to market, reduces initial capex.

Smart-Build Strategy: In contrast to traditional network deployments, in which carriers install their own physical connections in each market, competitors employing the smart-build strategy often install their own switches in each market and then lease the local access from another provider. As with DSL-based approaches, the smart-build strategy leverages the regulatory framework of competitive access to incumbent unbundled network elements. Advantages of the smart-build approach include accelerated market entry and reduced initial capital expenditures in each market, allowing the competitor to focus its initial resources on sales, marketing, and operations support systems.

The clear tradeoff with this strategy is that the competitor is reliant upon the incumbent (or other carriers) to ensure that physical connections to the customer are maintained. Further, smart-build operators incur monthly costs for each line they provide, whereas facilities-based providers generally do not.

UNE-P—A Specialized Form of Smart-Build: As discussed in Section 3, UNE-P refers to the combination of several unbundled network elements to form a complete service platform. UNE-P competitors usually forego investment in local access and central office facilities, but their services go far beyond simple resale of the incumbent's in that they are customized offerings that often utilize their own (rather than the ILEC's) network intelligence and back-office capabilities. Further, many UNE-P carriers have their own facilities for offering Internet access, Web hosting, long distance, and other services. Because of the details surrounding its implementation, this strategy is best suited for the residential and small business markets, where UNE-P margins provide opportunity for a competitor to enter a market, gain critical mass, and eventually migrate to a more facilities-based local network if it so chooses.

Beyond Smart-Build—Smart-Aggregation: Given the abundance of available options for last-mile access, not to mention the myriad of choices for such services as transport, wide-area networking, and hosting, several carriers have emerged that seek to combine many of these services, often from disparate carriers, into a customized service suite. Depending on the mix of services purchased from competitive or incumbent providers, these "smart-

aggregation" carriers can in principle forego CLEC status altogether in cases where they do not require direct interconnection with the incumbent network. Freed of having to construct their own end-to-end networks, and able to choose from among best of breed network service suppliers, smart aggregators are often able to focus on providing customer solutions, rather than just offer bandwidth and connectivity.

The customers of "smart aggregation" carriers benefit from these providers' experience in ordering service from their suppliers as well as bulk purchasing synergies that come from aggregating the demand of multiple end users. As with many other competitive providers, "smart aggregators" seek to deliver a branded, one-bill, bundled service suite to customers.

Building-Centric Strategies: 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 building-focused broadband service provider has emerged to meet tenant demand for high-speed services.

The building-centric service provider (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 office buildings, multi-dwelling units, hotels, and/or public venues such as airports and convention centers. This approach is similar to that taken by the smart-build and smart-aggregation 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).

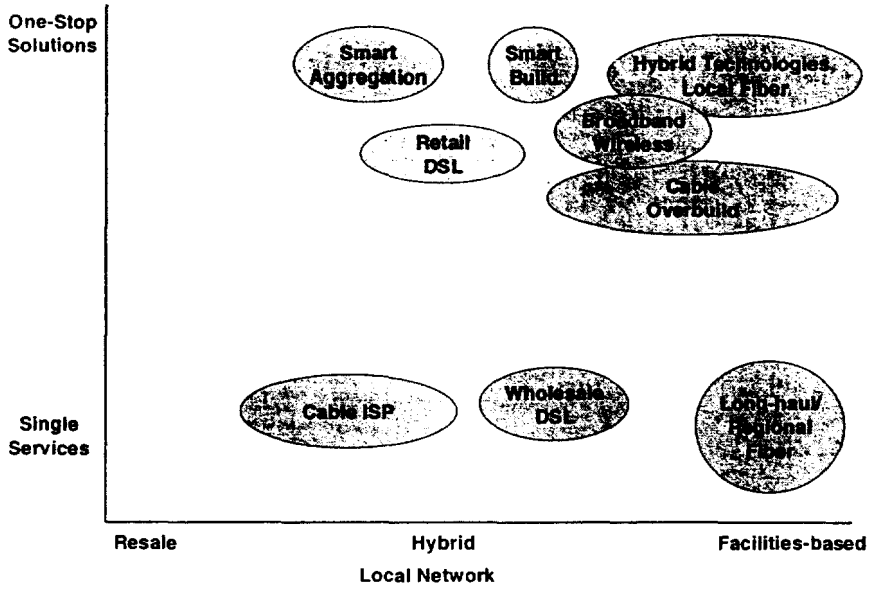
We summarize the various smart-build and related strategies along with other, technology-based market-entry approaches in the following exhibits.

Exhibit 1-5 ◆ Summary of Local Broadband Approaches

Approach	Strengths	Drawbacks/Limitations	Suitable Markets	Representative Public
Local Fiber	Highest bandwidth solution. Reliability. Flexibility (voice, video, data).	Expensive and labor-intensive deployment.	High-density business districts. Bandwidth-intensive enterprises.	ABIZ, ELIX, ESPI, ICIX, ICGX, T, TWTC, WCOM
Broadband Wireless	Quick deployment. Success-based deployment limits capital risk. Deployment is not dependent on establishing collocation with ILEC.	Requires clear line of site between transmitter and receiver. Susceptible to rain fade.	Businesses, Apartment Buildings,	AERI, FONN, NXLK, ORCI, WCII, WCOM
Cable	Cable plant passes nearly all homes. Deployment of two-way data services leverages ongoing investment in digital upgrades. No involvement with ILEC required.	Limited reach in businesses districts. Shared medium-requires special attention to data security as well as guaranteed minimum throughput. Provisioning currently requires one or more installers.	Residences, Multiple Dwelling Units.	ATHM, HSAC, RCNC, SOFN
DSL	Copper infrastructure reaches nearly all homes and business	Distance limitations and certain technology barriers currently	Residences, Small Business	
Building-Centric	Focus on in-building infrastructure and customer base simplifies network deployment and provides marketing and operational efficiencies.	Reliance on third parties for access and transport may not enable full end-to-end network control.	Businesses in Multi-Tenant Buildings, Multiple Dwelling Units, Hotels, Airports, Convention Centers.	ARCC, CAIS, CYCO, SOFN
Hybrid Facilities-based	Multiple access technologies and leverages network assets of varied suppliers.	Reliance on third parties for access and transport may not enable full end-to-end network control.	Businesses or Residences	
Smart-Build, Smart-Aggregation	Utilizes multiple access technologies and leverages network assets of varied suppliers.	Reliance on third parties for access and transport may not enable full end-to-end network control.	Businesses or Residences	ALGX, CONV, CPTL, CWON, FCOM, MPWR, NTKK, PACW

Source: Dain Rauscher Wessels

Exhibit 1-6 ◆ Relative Positioning of the Various Market-Entry Strategies



Source: Dain Rauscher Wessels

◆ 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 competitive broadband segment and underscore the appeal of this sector.

Access to Capital

As mentioned earlier, the broadband services business is capital intensive. Although the typical business model has a high degree of cash flow visibility, significant funding is required in the early stages for network deployment and market expansion. Given that the average competitive provider is funded until sometime in first half 2001, many companies will need to access the capital markets during the next few quarters.

The following exhibits depict the major public equity and public debt financings in the competitive broadband services sector during the past 18 months.

Exhibit 1-7 ◆ Major Broadband Services Public Equity Financings

Date	Company	Amount ($M)	Type
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

[illegible]	[illegible]	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		
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
Broadwan	Biztro, BizBuyer.com	payroll, procurement, quote requests, and other applications
Allegiance	Go2Net	small business resource portal, with future applications planned
ISC.net	ADP	payroll and human resource applications
WinStar	Office.com, Microsoft	office software applications, small business resource portal
MCI WorldCom USA	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.

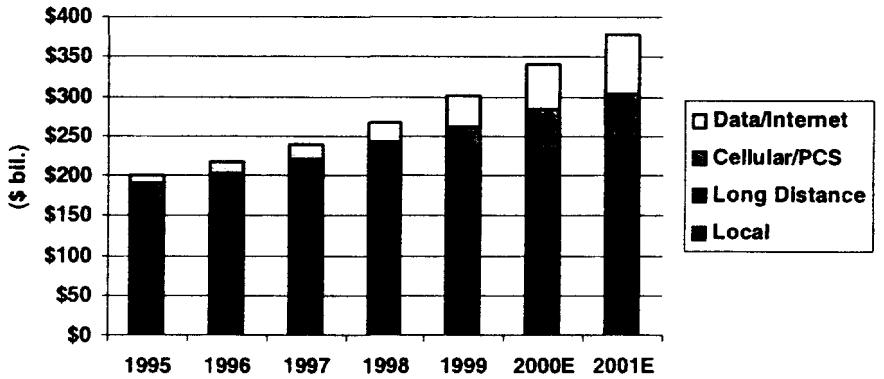
Smart-Build Providers: This category includes firms with **hybrid approaches** to technology and market entry that focus on solutions, as opposed to raw bandwidth.

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



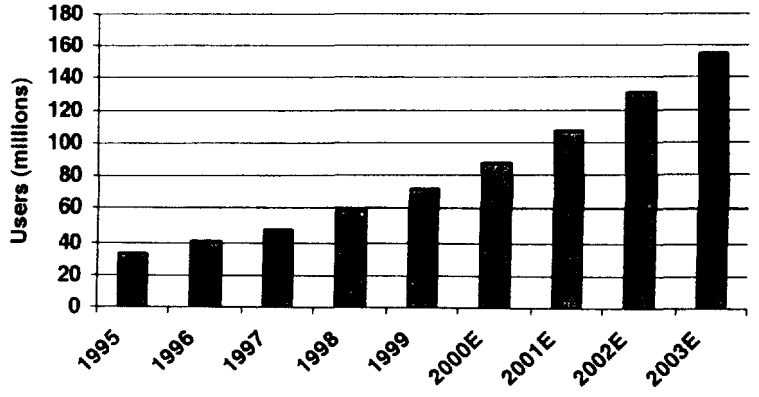
Source: FCC, and Dain Rauscher Wessels estimates

◆ 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



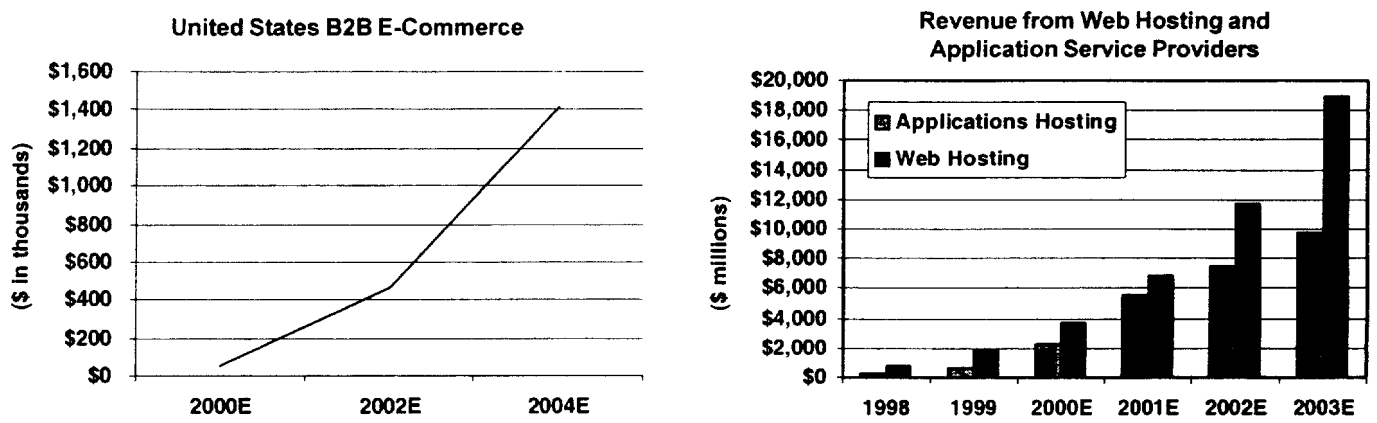
Source: Strategis Group

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.

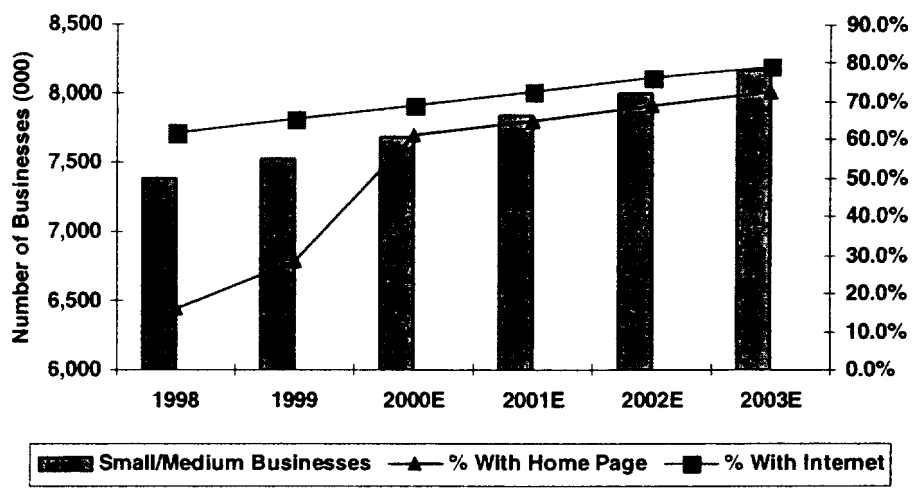
◆ Small and Medium-Sized Business Market

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

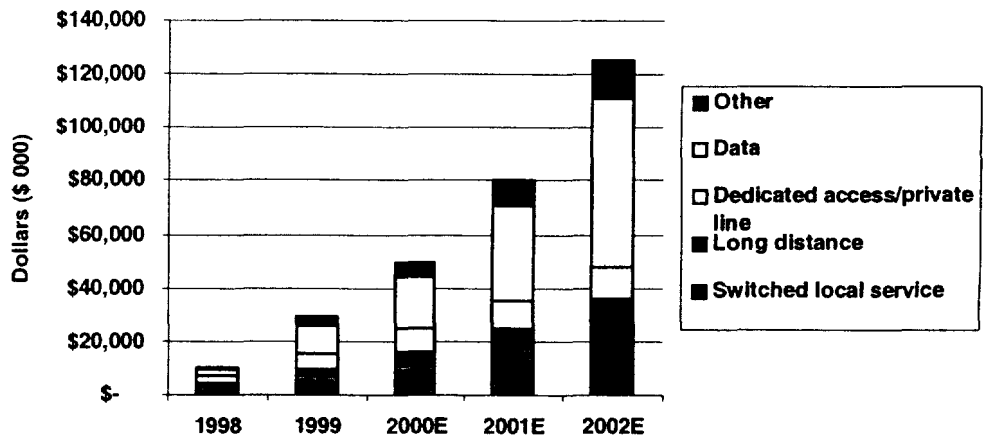


Source: International Data Corporation (IDC)

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 3:
Regulatory Framework for Competition