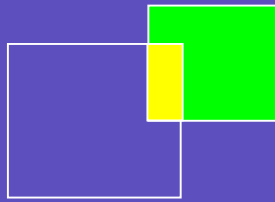




March 25, 2002



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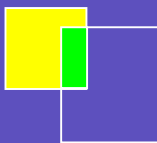
1317 Cherry Street
Denver, CO 80220
303.355.1982

Oklahoma Office

1307 South Boulder Avenue
Suite 120
Tulsa, OK 74119
918.382.0007

Texas Office

2208 Columbia Drive
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Why DSL Still Matters

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Still Alive and Kicking: DSL Today

Looking at the press about Digital Subscriber Line (DSL), it may appear to be a failure, but the technology is being deployed—and successfully deployed—by service providers worldwide. In North America alone there are well over 4 million DSL lines in service, and each of the largest service providers installs a quarter of a million new lines per quarter. The most innovative providers are launching new services like business-class DSL, home networking support, and gaming. In doing so, some are opening new revenue streams and attracting more appealing customers.

More importantly, service providers are beginning to realize the importance and benefits of continuing to support the expansion of DSL services, such as:

- **A Viable Business Case.** As equipment costs continue to decrease and provisioning becomes a more efficient process, DSL is becoming a positive contributor to the bottom line.
- **Competitive Pressures from other Technology Providers.** Cable and other broadband providers are beginning to use their networks to make inroads into telcos' voice and business services markets.
- **New Generations of Advanced Services like Video.** Broadband DSL is the best platform for telcos looking to offer advanced services without having to invest in huge infrastructure upgrades.

So why the bad press for DSL? This paper will explore some growing pains service providers have experienced deploying DSL, and how these miscues have blunted the potential of the technology to date. It will also explore how the technology has matured and how growing competition from outside forces (like cable companies) has made DSL even more vital to the ongoing success of telcos.

DSL: What Has Gone Wrong?

DSL technology has been in the minds (labs and networks) of telcos for about a decade now. Early on, it was envisioned as the access technology that would allow the video services then promised by ILECs. Obviously, these deployments never happened, but in the late 1990s a couple of things did happen, bringing DSL back to the fore.

First, the Telecom Act of 1996 brought the promise of competition in the local loop. Competitive Local Exchange Carriers (CLECs) sprang up nationwide, many focused on providing not just voice, but data services to businesses using the newly unbundled local loop. As these competitive providers looked for cost-effective ways of providing alternatives to T1 and private line services, DSL became their prime technology. The telcos' turn towards DSL was bolstered by the development of international standards, particularly the G.dmt standard for ADSL. This standard enabled chipset vendors to produce standards-based chipsets in volume, reducing the per port cost dramatically compared to lower-volume proprietary DSLs.

Secondly, the Internet moved from a relatively obscure academic and governmental network straight into the public eye as the next big thing. Businesses and consumers alike moved “online” at a rapid pace. Internet Service Providers (ISPs) like AOL became multi-billion dollar corporations, and the number of users connected to the Internet grew at an incredible pace (1000% per year by some estimates). Increased computing power and development of new applications for both consumers and business (things like streaming video and audio for consumers, and ecommerce for businesses) helped create a broad-based demand for something faster and more robust than dial-up Internet.

The boom in Internet demand was closely mirrored by a boom in capital markets, which created massive amounts of funding for any enterprise with a “Dot Com” in its name or business plan. Competitive DSL providers received generous venture capital funding, and CLEC stock IPOs created literally billions of dollars of funding for network buildouts nationwide. Incumbent telcos followed closely in the footsteps of the CLECs and began their own multi-billion dollar network buildouts and service rollouts. For DSL in 1998, the sky certainly seemed the limit, with DSL appearing to be ready to make a rapid transition from an early adopter “new technology” to a true mass-market product.

The Downturn

So just a few years later, how have we reached the point where many pundits believe that DSL has been a failure? In 1999 and for most of 2000, DSL providers were overwhelmed by demand, and backlogs into the tens of thousands of lines were common daily realities for many carriers. 2001 has reversed this trend rather dramatically, with growth rates measured in the tens rather than hundreds of percent, and total installations often decreasing from quarter-to-quarter.

What happened? Unfortunately several scenarios have played out in a short period of time—some internal to the DSL industry, some not—and given DSL a black eye.

Among these setbacks have been the following:

- The collapse of competitive providers
- Capital markets contraction reducing funding
- The rise of cable providers as strong competitors
- Database reconciliations by the telcos, which created a false impression of drastic reductions in service deployments
- An overall economic downturn

The last item is obviously out of the DSL providers’ control, but the first three are worth a closer look.

Competitive providers of DSL services were once the darlings of the stock market, and just about all invested billions of dollars on large-scale, nationwide network deployments. Profitability was never really a reasonable short-term goal for these providers because of the scope of these buildouts, but any hope of financial viability was severely limited by several factors. First, the business model of most CLECs was built around a wholesale model with the CLEC providing only the transport and third-party ISPs “owning” the customer and providing any value-added services. This led to rapid pricing decreases and an almost immediate commoditization of DSL transport. Commodity transport is a business that only the largest and richest telcos can play in, and debt-laden startups are in a particularly poor position when their flagship product requires several years before it can become margin positive. The aggressive entry of incumbent telcos (with inherent cost advantages because of their ownership of the physical plant) into the DSL market intensified these pricing pressures. This rapid commoditization has been a double-edged sword for the incumbents too, and basic DSL services have not proven to be highly profitable for many.

Even if CLECs had been able to overcome these pricing pressures, failures to efficiently implement DSL deployments were also major issues for them. Manual provisioning processes, poor coordination between ILEC, CLEC, and ISP, and just plain bad execution caused DSL to gain a reputation as buggy, unreliable, and hard to get. Potential customers had a hard time discovering if they could even get DSL services and, after placing an order, they often found themselves waiting for months for an installation. Unfortunately, the technical DSL issues were played out in front of the entire customer base and caused non-tech savvy customers to steer clear of implementing an unproven technology.

The wholesale model of most CLECs also affected their marketing and service packaging. The larger CLECs often had literally hundreds of ISP partners, each with their own service pricing, bundles, and packaging. The CLEC itself had little ownership of the customer except when network problems arose, and because of this, found it nearly impossible to offer revenue producing value-added services like VPN, security, and web/e-commerce hosting.

CLECs and the DSL industry in general marketed their products well for early adopters—with technology and high-speed connectivity as the major themes. Unfortunately, as the market moved towards less technologically advanced customers, the marketing message never truly evolved in a way that would convince the average Internet users of the benefits of migrating to a broadband solution. Service packages tended to be based on speed differentiation alone and not on services (like home networking or gaming) that would generate real enthusiasm for DSL. The majority of today's DSL providers still have not crafted a clear and concise message to help an average residential user understand, Why would I buy DSL service?

The result of these barriers to the CLEC market has been a major rationalization of the market. Just about all the largest CLECs have faced bankruptcy, with few surviving the process, and scores of smaller CLECs have either shifted their focus away from DSL or closed their doors and gone out of business.

In addition to these strategic and tactical business and marketing missteps, the DSL market (for both the competitive and incumbent providers) has been rocked by the collapse of the "Dot Com boom" of the late 90s. Business plans which promised profitability in five or six years at the earliest were no longer acceptable to shareholders, and funding for new entrants (or continued network buildouts of existing players) was dramatically curtailed. The financial industry changed the rules of the game in midstream. This new game did not focus on the level of deployment and number of customers reached; it focused on the profitability of the DSL services offered. Even the most financially robust DSL players—the incumbent telcos—were affected by these capital constraints. Capital expenditures throughout the telecom industry were frozen, reduced, or worse. Plans to increase the footprint of DSL deployments have been reduced or put on hold entirely. New capital expenditures for even the biggest players in the current market tend to be limited to those that can increase revenues for existing networks and not on those that expand or replace existing infrastructures.

The Cable Threat

While these issues have slowed DSL deployments, the cable industry has out-executed DSL providers and established itself as a notable competitor. Cable modem deployments to date are nearly double those of DSL, and in the consumer market they are nearly three times those of DSL. Cable has not been entirely immune from problems, as the recent failure of the cable modem ISP @Home has proven, but the cable MSOs themselves have been growing rapidly and increasingly encroaching into the telco marketplace.

Cable companies have been more aggressive and innovative in service offerings than DSL providers and have proven to be more effective at deploying their services.

For example:

- Cable MSOs have been ahead of DSL providers in offering value-added services like gaming and home network support. Residential customers understand the reason to buy this service.
- Cable MSOs have begun to make significant inroads into the voice market. They have over 1 million customers online, and significant technical improvements in voice services soon to be enabled by the next generation of DOCSIS cable modem systems—an alternate to existing voice and secondary teen lines through an already trusted provider.
- Cable MSOs can already or will soon be able to offer consumers complete bundles of voice, video, and data services, with video on demand and other complementary services already in trial. A complete solution is available from a single provider for all end users' entertainment and connectivity needs.
- Cable MSOs have had inherent advantages in provisioning because of the nature of their networks. When a cable MSO builds out a two-way network in a service area, broadband is often immediately available to all customers. This is unlike a typical DSL network buildout where long loop length customers and customers served by remote cabinets or Digital Loop Carriers (DLCs) are often frustrated by their inability to get service. Cable has a larger addressable market to serve.

A Shifting Focus

Because of these frustrations, some incumbent providers have shifted their focus away from DSL towards other initiatives. The slowdown in customer acceptance and weak margins on basic DSL services have caused many incumbents to focus more attention on services they believe will be more competitive and profitable.

Additionally, the early provisioning and service woes of DSL deployments have left some service providers wondering if there is a better path to be taken. Passive Optical Networks (PON) technology has made rapid strides recently in terms of economics and deployability, and some of the largest telcos have been trialing it in hopes of using PONs in Greenfield deployments such as new housing developments. Indeed, there is hope that the technology will become economically attractive enough to be deployed in an overlay network, adjacent to the existing copper infrastructure throughout the network.

Vendors Retreat from the Market

The vendors serving the DSL market have fared no better than the service providers. Those primarily serving the CLEC market have in multiple cases found themselves unable to remain viable companies and have moved entirely out of the DSL market (with varying degrees of success) or have gone out of business entirely. The largest vendors serving incumbent carriers have remained successful, but weaker players in this market have also succumbed to the consolidation seen in the CLEC market.

This retreat from the market should not have, in and of itself, substantially affected the overall viability of DSL (given the large number of startup and established telcos that entered the market in the late 90s). But many of these failures have been widely publicized and, when combined with the failures of CLECs, have helped to give the DSL market a black eye in the public's perspective.

Conventional Misconception: DSL Is Unprofitable

So far the focus has been on the problems. DSL has not yet reached the promise of its initial hype and in many ways has been labeled a failure. The biggest and most pernicious perception of the DSL market has been that it is simply not a profitable business in which to be.

Much of this perception is based on the failures of the CLECs. As discussed previously, competitive providers entered the DSL market with certain assumptions about growth rates, service pricing, and provisioning and customer acquisition costs that simply did not turn out to be true. The business models of CLECs—offering wholesale transport services—placed them into a market that rapidly became commoditized, with the razor-thin profit margins that go along with such a market. The failure of these providers has caused many observers to conclude that DSL is simply too expensive to deploy profitably.

Indeed, even in the networks of incumbent providers who have begun to enter into mass-market scale deployments of 1 million customers or more, the perception that DSL is just not cost-effective remains.

The reasons for these high costs have included:

- **Risky Capital Investment without Commensurate Returns.** Economies of scale and technological advancements such as increased density of components and reductions in the bill of materials for equipment were not realized for initial DSL deployments, making the cost per customer of network equipment relatively high.
- **Labor-intensive Installation Procedures.** Early deployments of DSL almost always included a truck roll to the customer's premises, often multiple truck rolls. Technicians were not cross-trained, so both a telephone technician and a computer technician were required.
- **Little Automation and Streamlining of Provisioning Processes.** Coordination both within the telco (e.g., between data and traditional telephony provisioning systems) and without (between ISP, ILEC, and CLEC) required manual intervention and "swivel chair" management. (A technician literally entering commands on several different OSS/BSS systems to order and provision a line.)

These high costs could be immediately felt on the bottom line of the DSL provider's books while relatively low-cost services took up to five or more years to reach a breakeven point on the investment.

The perception remains that these initial costs of deploying DSL remain high, but in reality they have been greatly reduced.

For example:

- For ADSL lines, most providers are now at 90% or higher self-installation rates. This alone can reduce the cost of acquiring and provisioning a customer by up to \$250.
- Automation has been added throughout the provisioning process to reduce both costs and time to provision. The most aggressive providers have instituted fully e-bonded solutions that allow a customer to order service online and track the entire automated provisioning process right through the self-installation and service turn-up phase without intervention from telco personnel.
- Much of the capital expenditures are already sunk costs. Digital Subscriber Line Access Multiplexers (DSLAMs) have already been installed in a large percentage of incumbents' central offices. Marginal capital expenditures tend to be for smaller ticket items like additional line cards for DSLAMs or for equipment supporting remote terminal/DLC deployments. When new central office deployments are required, equipment pricing is considerably lower than it was during the initial phases of deployment.
- Costs for Customer Premises Equipment (CPE) have also been greatly reduced. Standards-based ADSL combined with more than ten million worldwide deployments have enabled vendors to reduce the cost of this equipment to levels equivalent to those of analog modems just a few years ago.

In fact, these reduced costs have culminated in successful deployments of DSL in a variety of markets, by providers both big and small.

Regulation and DSL: Is This an Issue?

DSL providers, particularly the incumbent providers, have made much of the regulatory environment's impact on DSL deployments. This is particularly true when examining the issue of competitive providers. Many incumbent providers feel that existing regulations create an environment in which the pricing they are forced to offer to competitors is simply too low to cost-justify further investments in DSL. There is also an air of uncertainty regarding regulatory actions which have not yet been finalized, resulting in telco doubt that future deployments will operate with pricing anywhere near the costs.

Publicly held telcos are among the most widely held stocks in the world, and shareholder interests—meaning a positive business case for new investments—are critical to them. When regulatory restrictions or the fear of future restrictions from unbundling and TELRIC rulings which have yet to be clarified cause a telco to foresee a negative return on investment, that investment will generally not be made.

Additionally, telcos rightly point out that their competitors in the cable world face considerably less regulation and are much less "open" to competitors than are the telcos. Indeed, competition for cable modem service providers, where it exists at all, consists of "open access" for ISPs but no requirements for physical collocation or other access to their facilities.

Successful DSL Deployers

Korea Telecom (KT). Perhaps the most successful DSL deployer to date, Korea Telecom is the largest DSL provider in the world with nearly 3 million lines in service. Because of KT's aggressive deployment (it expects to have nearly 100% coverage by 2003), Korea is the most broadband dense market in the world with more than 50% of Korean households using broadband.

KT has incorporated an extensive provisioning automation system, so that new customers can be turned on with a "one-click" process that enables self installs with practically no manual intervention on the part of the service provider. Value-added services are widespread with broadband-enabled gaming being the primary service. Despite basic service rates less than half of those in the US (approximately \$19/month), KT expects that its high penetration and widespread adoption of value-adds will make the service profitable by 2003.

BellSouth. Currently the most aggressive RBOC in terms of DSL deployment, BellSouth's DSL subscriber base nearly tripled during 2001 while the US industry as a whole grew less than 100%. Even more importantly from a business standpoint, DSL revenues for BellSouth grew by more than 400% during the year.

BellSouth has achieved this growth through several means. First, it has aggressively deployed Remote Terminal (RT) DSL installations with more than 8,700 RTs enabled by year-end 2001, making BellSouth DSL services available to nearly 70% of households in the region. Second, BellSouth has launched a series of provisioning and marketing initiatives such as online marketing/sales and online provisioning. These initiatives have greatly reduced the cost of adding new customers, with residential customers needing only 12 to 14 months time in service to become profitable, and business customers in an even shorter timeframe. As a side benefit, reducing these costs has enabled BellSouth to justify its aggressive RT rollouts.

Finally, BellSouth has targeted its deployments and marketing efforts with extensive market research concerning customer demographics, computer use, and other factors, which lead to a propensity to adopt broadband. As a result, BellSouth has been able to effectively market services head-to-head with cable providers. Nationally, cable providers have twice the market share of DSL, but BellSouth has been able to obtain greater market share than the incumbent cable MSO in its major target markets.

Alaska Communications Systems (ACS). Rural markets remain a weak point for DSL deployment, as both RBOCs and national DSL CLECs tend to concentrate their deployments in Tier 1 and 2 cities and suburbs. ACS, a facilities-based CLEC serving the Alaskan market has taken advantage of this situation by aggressively deploying services in small, rural Alaskan villages. ACS has taken advantage of its legacy satellite network to provide the backhaul bandwidth to villages that would otherwise be "off the grid" and utilizes a combination of DSL, cable, and wireless technologies to cross the last mile in these villages. ACS has learned a valuable lesson during its rural broadband rollouts. Despite demographics that might indicate otherwise, rural users tend to be quite aggressive adopters of broadband services because services like ecommerce and online communities enable a connection with the rest of the world that would otherwise be impossible.

Faced with a regulatory environment stacked against them, many telcos have taken a conservative approach towards expanding their DSL deployments. This tactic is shortsighted, however, as it does not take into account the entire business case for DSL. Cable MSOs are already the dominant provider of broadband services in the US, and these competitors are moving aggressively to gain substantial market share in the voice market, using voice over cable solutions. So the true business case for telco DSL deployment must take into account not only the costs of providing DSL service to customers and competitors alike, but also the costs of lost data *and* voice revenues as cable MSOs use their dominant position in broadband to steal away core voice customers from the telco.

The Broadband Market Is Saturated

Another claim forwarded by many industry pundits is that the market for broadband was never as big as originally envisioned and is already adequately served by existing DSL and cable deployments. To the degree that the marketing efforts and service packages offered to date have not really "reached out" to many satisfied dial-up customers, this is true. A big pipe to the Internet is attractive to a (relatively large) number of technically advanced customers, and many of these early adopters are already using broadband of one sort or another.

But this does not mean the market opportunity for broadband has already peaked. For example, well over 60% of homes in the US have a personal computer, and a near majority of these homes now have two or more computers. These multi-computer homes, which tend also to be more affluent, might greatly benefit from a broadband service that could facilitate home networking and simultaneous Internet usage. Unfortunately, until very recently, none of the major DSL service providers offered a service package that explicitly supported such a service or that made it easy for the average consumer to accomplish.

Is it any wonder that many users are still "on the fence" about broadband when the kinds of applications that might entice them to move up to DSL from dialup are simply not supported? Gaming, firewall, audio, and other applications, along with a compelling marketing effort demonstrating how broadband enables them, could go a long way towards dispelling the myth that the market is saturated.

Successful DSL Deployers (continued)

Aliant Telecom. *One of the most innovative uses of ADSL technology can be found in Canada. Aliant Telecom, Canada's third largest telecom operator, was the first company in North America to offer a commercial interactive Digital TeleVision (iDTV) service using ADSL. For many years it has believed in the necessity of a "triple play" combining telephony, data, and video entertainment from both a customer-retention and revenue-generation perspective.*

Aliant Telecom has responded to the video opportunity by offering customer controlled video services to both the television and the PC. The iDTV service is currently offered in three urban centers and provides more than 200 digital channels of audio and video together with email, web browsing, and a video optimized portal. Its iDTV offering has increased the average incremental revenue per customer by \$53 (Cdn) per month while providing 52% of these customers with web access for the first time. Where offered, iDTV has achieved in a very short time a market penetration of approximately 6% from the traditional CATV operators. Intent on harvesting its network investment in ADSL, Aliant Telecom has also launched a service using MPEG-4 encoding to provide PC access to the 10 most popular broadcast television channels along with an electronic channel guide. Provided that a consumer has a basic high-speed Internet service (1Mbps) connection, the customer will self provision and modify the service through a web portal. The cost of the service is approximately \$10 (Cdn) per month.

Recent competitive service bundles by cable television operators have demonstrated the compelling need for convergent service offerings on the part of telecom operators. Aliant Telecom recently began offering a highly successful bundle which includes unlimited use of high-speed Internet, toll calling (within Canada), call management features, after-hours mobile calling, local service, and iDTV at a price of \$125 (Cdn).

There Is No More Competition

Another widely held perception, particularly among incumbent DSL providers, is that no more real competition exists in the DSL market, so they can afford to “coast” and not seriously pursue expanding their DSL deployments. Like the perceptions discussed previously, this is partially rooted in fact. Many CLECs that first provoked incumbent providers into entering the DSL market are in fact dead; the few that remain are weakened. So, in some sense, the enemy has been conquered.

Cable MSOs and the threat they pose have already been discussed, but the possibility of competition within the DSL world itself has not disappeared. For InterExchange Carriers (IXCs), DSL is an excellent companion to their existing data services and also provides a means of acquiring (or reacquiring) ownership of both business and residential customers with a broader array of services. Local voice services enabled by DSL connections could enable companies such as AT&T to move back into the local markets and, like the cable companies, threaten incumbents for more than just broadband services. Interestingly, the seemingly dead CLECs can play a big part in this strategy. Although their own businesses are no longer strong competitors, their nationwide reach and physical presence in thousands of central office collocations makes them quite useful to providers who wish to enter the market. IXCs have already acquired the networks and assets of large CLECs while out-of-region-minded incumbents have announced strategic partnerships with others.

Why Is Broadband Still Important?

Thus far we have discussed many market facts and perceptions used by customers, service providers, and market influencers to claim that broadband, and DSL in particular, is no longer viable or important to telcos. These claims have certainly had some effect on the market, as both competitive providers and incumbents have slowed or de-emphasized their DSL efforts.

There are many good reasons, however, why broadband and DSL are more important than ever to the telco.

For the incumbent provider, DSL:

- **Enables the ILEC to Own the Customer.** DSL, particularly when combined with ILEC-branded ISP services, can keep the customer “in-house” and drive increased brand awareness and satisfaction with the customer base. Providing broadband DSL services helps create mindshare with customers and lets them know they can go to their ILEC for more than just a phone line.
- **Protects Valuable Voice Customers.** Cable MSO, Voice CLECs, and even wireless providers are all vying for the consumer and business voice market share. For the ILEC, basic voice services are a slow-growing but still vital revenue source and are the basis of higher-margin services like voicemail and Caller ID. When customers also choose the ILEC for DSL services, they can be more easily incented to remain voice customers, especially when service and billing bundling is incorporated into the overall package.

- **Enables Advanced Applications.** A DSL infrastructure allows ILECs to offer next-generation services and enter into the entertainment market with offers like video on demand and gaming. This produces more customer “touchpoints” and can reduce churn by making it more difficult for a customer to migrate to a new service provider.

For the competitive provider, DSL:

- **Provides a Relatively Inexpensive Way to Enter the Data Market.** Voice CLECs wishing to offer data services can take advantage of industry-wide improvements in provisioning and order automation and decreasing equipment costs to make business models more feasible. The advent of ADSL line sharing, while perhaps too late to help the first generation of DSL CLECs, has also helped to greatly reduce recurring expenses and improved the business case for competitive providers.
- **Is Complementary to Existing Voice Services.** DSL can be provisioned using the same Unbundled Network Elements (UNEs) used for CLEC voice services and, with Voice over DSL (VoDSL) technology, can actually be used to provide voice services while reducing recurring expenses for the lease of copper lines.

Value-added Services for the Future

For both the incumbent and competitive provider, DSL’s greatest opportunity lies in the realm of value-added services. The conventional wisdom that DSL is unprofitable is based on deployments of basic, Internet access-only services. The picture can change, however, as value-added services are added to the portfolio.

In the short term, as more aggressive DSL providers have discovered, even relatively simple and inexpensive services can contribute to the bottom line by increasing both overall margins and average revenue per user. A few of these services have been discussed already, such as home networking support.

Other easily implemented services can include:

- Security services like firewall and virus protection
- Remote file storage solutions
- Online gaming and entertainment for the residential customer
- Quality of Service (QoS) differentiated services for businesses and high-end consumers (e.g., latency and bandwidth guaranteed services for gamers)
- Over the longer term, more sophisticated broadband services like video delivery and videoconferencing for businesses are potential applications. For example, Korea Telecom, the largest and arguably most successful DSL provider in the world, has over two million customers subscribing to its broadband-only online gaming service (NCSOFT’s Lineage, the Blood Pledge). Such applications have a dual benefit: First, they serve to increase revenue per user for current customers; and second, they help to attract new customers with an attractive application that simply cannot be done on dialup.

- A recent study by the research firm Parks Associates found that 75% of consumers are satisfied with their current dial-up Internet connections. Obviously, the marketing of DSL and broadband to date has not met its goals with this majority of Internet users. Discovering and effectively marketing “cannot do it on dialup” applications should be the key focus of DSL provider product management teams. Today’s focus on technology and speed simply has not done the job.
- However, some providers have made great strides recently in this arena. Teaming with innovative ISPs and content providers, they have shifted their marketing efforts away from their original technology focus and towards a more services-oriented focus. For example, US-based DSL ISP Speakeasy.Net has launched a series of value-added services including gaming packages, music downloads, network administrator packages, and firewall services—each service at a \$5 to \$10 premium over its base service. These services were all designed to utilize the broadband connection, and all would be less usable (or perhaps impossible) to provide over a dial-up connection. The results? The ISP had a 350% growth in subscribers during 2001—about four times the industry average.

Cable Is A Strong, Viable Opponent That Is Not Going Away

Value-added services can help make the business case for continued DSL deployment and indeed can probably justify the deployment all on their own. The market has proven, though, that telcos often need the threat of competition to act. As discussed earlier, that threat, in the form of cable MSOs, is very real and poised to become even larger.

- Cable companies have proven competencies in content and entertainment delivery—after all their primary business has long been in video, and they increasingly own not only the delivery network, but also the content creation companies. Additionally, cable companies have brands that are quite well established and are, in many consumers’ minds, synonymous with entertainment.
- Voice is already an established service with cable MSOs. The largest cable voice player alone has over a million customers, and other MSOs have deployments in the hundreds of thousands. Voice penetration rates in residential markets are often greater than 10%, with as many as 30% of customers taking multiple lines. These customers are almost always being lost by the incumbent telco and are probably among the most attractive in a demographic sense. These customers are also more likely to stick with cable—cable MSOs consistently report lower churn rates for their voice/data/video bundle customers than any other group.
- The next generation of standards-based cable technology, DOCSIS 1.1, is now in production and is widely expected to be deployed in service providers’ networks by the end of 2002. DOCSIS 1.1 was designed expressly to enable QoS and guaranteed bandwidth (the lack of which were shortcomings to previous cable technologies) and will allow even greater and more efficient deployment of voice services. Particularly, this new generation of cable technology will support packet-based voice services with the inherent cost and bandwidth savings when compared with circuit-switched voice.

- Residential customers have been the primary focus of cable MSOs—a logical market strategy given their installed base—but many are now turning their focus towards business customers. While the coaxial “last mile” of cable providers often does not touch the business districts and industrial zones within their serving areas, the fiber ring backbone of the cable network does. Initial business efforts have focused on using leased T1 circuits to provide customers with access to this fiber backbone, but now cable providers are exploring building out their own last-mile network to these customers (removing the telco completely from the revenue picture).

Solutions for an Ailing Market

DSL providers have been less than fully successful in marketing their services to date and now face an entrenched and well-funded competitor in the cable MSOs. What steps should a telco take to improve DSL and face this threat?

Packaging of Services

Bundled services have developed a bit of a bad name in the telco market recently, as some carriers' attempts to provide voice and data packages have been unsuccessful. These initial efforts have often failed simply because they were ahead of their time, both technologically and in terms of the market's acceptance of such services. Cable companies, however, have been proving for several years that well-designed and well-marketed bundles can indeed be successful. Some DSL providers have begun offering their first generations of service packages, including offers of residential gateways, home networking support, and even initial trials of video on demand.

With the development of more advanced voice and video services and the concurrent development of new in-home distribution networks, DSL providers will soon reach further into the home, providing more than just basic POTS and Internet access services. In the competitive marketplace, a few intrepid independent or competitive providers are already offering gaming, video, and other services. None of these services have yet reached mass-market numbers (mainly due to the small size of the providers), but unlike many of their fellow CLECs, these providers remain in business and on the path to profitability.

Raising the Level of Customer Awareness and Desire

DSL has become a relatively well-known technology—even non-technical consumers have some understanding that DSL provides high-speed Internet access. Unfortunately, these potential customers are likely to have heard of DSL in negative stories about provider failures and provisioning nightmares. DSL providers must focus on educating the market regarding the benefits of DSL, and the services it can enable.

- Residential customers require basic education about DSL and, in particular, the advantages of DSL vis-a-vis cable. DSL advantages, such as guaranteed bandwidth, lack of shared network elements, and services supported by DSL's higher upstream speeds should be emphasized in this comparison.
- Business customer education should focus on the need to adopt broadband services and the business benefits that DSL can provide. Messages like increased productivity and streamlined business processes through ecommerce should be emphasized.

Beyond creating awareness of DSL, providers must focus their marketing efforts at creating excitement for DSL among potential customers. DSL advertising and marketing materials should create excitement in the marketplace about new services enabled by DSL. Specifically, these messages should focus on applications not possible on dial-up connections and on applications specifically supported by DSL providers. It is OK to continue some of today's messages about performance, but these should be tied into messages differentiating this performance from that of other broadband services (such as the superior upstream performance of symmetric DSL services).

Ease of use for new applications is another key message for both the consumer and the business customer. Providers should keep in mind that many things they wish to offer as services (like video downloads and home networks) can be offered by other providers (video downloads from web pages or home networking by "do-it-yourself" kits). The differentiation and value to the customer comes from the way the DSL provider can facilitate these services and support them when the customer needs help.

Expanding the Market Opportunity

The market opportunity for DSL can be expanded to include groups of customers who today have little alternative to dialup or more expensive Internet access methods. For example, many business markets are currently unable to find reasonably priced alternatives to dialup because of the demise of the competitive providers who were previously focused on them. Small businesses, teleworkers, and enterprise branch offices are all too often forced to revert to dialup or obtain more expensive T1 services, simply because they have no viable alternatives. Telcos should remember that cable MSOs have explicitly stated that these are their next target market.

On the consumer side, partnerships with equipment vendors may help to expand the market demand for DSL services. As an example, service provider partnerships with PC vendors like Dell and Compaq have proven to be quite popular. They provide customers with instantly DSL-ready PCs (meaning less customer support is needed to get subscribers online) while at the same time arming service providers with yet another marketing channel with which to reach customers. Other vendor partnerships, outside of the PC arena, can help to expand the market and help the service provider reach further into the home. For example, a partnership with a game console vendor could help drive sales of value-added services while a partnership with a residential gateway vendor could help drive marginal revenues by increasing demand for multiple IP address/multiple email address services.

DSL in a Changed World

The terrorist attacks of September 11th have forced many businesses to re-examine their policies for security of both data and people. One result of this rethinking has been an increased awareness of the benefits of a distributed organization. For many companies, the most valuable assets are neither buildings nor machines, but rather Intellectual Property (data) and the people who create IP. In the past, moving people and data to remote locations was difficult, if not impossible, and telecommuting or remote offices were considered privileges for a small number of elite employees.

In today's more security-conscious world, many companies are beginning to consider decentralizing many of their operations and allowing employees to work in their homes or in small offices away from the headquarters. In order for employees in these remote locations to be productive, they require a broadband access solution that makes them "feel" like they are in the office and on the LAN. Provisioning T1 or private line services to many of these remote locations is neither cost-efficient nor practical. DSL, on the other hand, is an easily-provisioned and secure means (when combined with encryption and VPN) of keeping these valuable workers productive, happy, and on the LAN.

Reach Extension

The slowdown in capital expenditures for DSL deployments has left many providers behind their cable competitors in terms of ability to reach all the customers in a particular market. Early DSL deployments were hampered by DLCs and loop reach issues that, in many cases, have yet to be addressed while cable companies were able to reach nearly all customers in a serving region.

Customers do not understand (and should not have to) the intricacies of the DSL network. When a neighbor or colleague in the same town can get DSL, they expect that they can too. There are too many stories in the industry about customers who actively pursued DSL on their own initiative and were turned away. Once these customers switch over to cable or another broadband technology, the cost of winning them back is significant.

Even in a period of reduced capital expenditures, this is a problem worth addressing:

- Implementation of DSL in remote terminals is no longer a new technology. One aggressive DSL provider has enabled DSL in over 8,700 DLCs, so previous arguments about this not being a proven technology no longer hold water.
- New standards-based line code technologies, such as SHDSL, can significantly extend the loop length of DSL for remote customers and can often be integrated into existing infrastructure equipment without major refits or redesigns.

Pricing Strategy

Pricing is another area that has caused issues with the widespread deployment of DSL. As discussed earlier, DSL service pricing was influenced by both competition and the freely available financing of the DotCom boom. The seemingly endless capital supply for competitive providers enabled many to enter the market and also encouraged them to build out their networks without an eye towards profitability. Prices for DSL service rapidly became commoditized with disastrous consequences for CLECs after their funding ran dry. This was followed by an immediate pricing increase by the remaining providers, without any similar increase in service quality or perceived value to customers.

This increase in pricing (a substantial 25% hike in most cases) caused negative reactions throughout the market and most likely led to many consumers putting off DSL subscriptions.

A more sensible pricing strategy for DSL providers is to recognize that lower, commodity-level pricing can help bring customers in the door. Many successful international DSL providers offer services at prices roughly equivalent to US \$25 to \$30 per month for basic service, compared to US \$50 for domestic providers. KT, for example, expects to be profitable by 2003 at this price level.

Telcos will protest that their profitability is minimal or non-existent even at today's levels, but the key to understanding this model is to examine not the basic service revenue but the total revenue per customer. A cheaper basic service may indeed reduce margins in the short term, but if it is followed up by a menu of value-added packages, the overall revenue per user should increase, not decrease. The cable MSOs have, again, taken this lead and been successful with it. Basic cable modem services are typically 10% lower than basic DSL. However, the overall revenue stream to a cable provider offering a bundle of video services, basic high-speed Internet, value-added services like home networking support, AND voice services tends to be much higher than that of a DSL provider on a per customer basis.

Summary

In conclusion, DSL has thus far failed to meet its early expectations of mass-market success. Poor business plans and even poorer execution by some providers have led to a situation where many industry observers and, more importantly, potential customers have decided that DSL is an "also ran" when compared to cable. Many DSL service providers, both competitive and incumbent, have responded by decreasing their DSL rollout plans, de-emphasizing DSL in their strategic portfolio, or even by leaving the DSL market altogether.

At the same time, some providers have been successfully deploying DSL, both domestically and internationally. The difference between these groups is that the successful telcos have responded to the market, ironed out their provisioning and technical issues, and begun to make DSL profitable by reducing costs and emphasizing value-added services. This approach should not be unfamiliar to the telco where basic voice services revenues are relatively low and highly regulated, but a host of value-added voice services has generated considerable profit.

Some providers, by the very nature of their organizational constitution, tend towards the conservative approach, waiting for more proof of DSL's viability (or some regulatory relief) to continue their investment in broadband. They do so at their own peril because their cable competitors are not standing idly by. They are aggressively pursuing not only their traditional stronghold of entertainment and their new stronghold in high-speed Internet, but they are also moving rapidly into the voice services which "pay the bills and keep the lights on" for most telcos. It is no longer just a matter of losing a potential Internet customer to the competition, but rather the prospect of losing the core voice customer base. Once lost, these customers are difficult and expensive to win back—a scenario that should keep telco executives up late at night.*

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