



Taking the Next Step: Migrating to Broadband Services

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Overview

Staying afloat in today's narrowband market is becoming increasingly difficult. As the popularity of broadband continues to soar, many small narrowband providers are looking for ways to ease gradual declines in market share and revenue, and the task is an arduous one. The narrowband market is an extremely competitive landscape dominated by a few national service providers operating on thin margins. Leveraging customer subscription bases to receive preferred pricing from network access providers (NAPs) is commonplace and makes it tremendously difficult for smaller service providers to compete. Making every effort to retain profitability causes many of these providers to consider any and all options. The option that currently offers these desperate Internet service providers (ISPs) the most promise is the lucrative broadband service marketplace.

According to Claudia Bacco, Vice President of Consulting for TeleChoice, "Narrowband service providers face a turbulent future if they fail to plan for the future of broadband services." Bacco states, "With the demand for broadband services continuing to reach higher levels, narrowband service providers wishing to enter this market need to begin planning now for success." It is therefore imperative that narrowband service providers find a deployment solution that will allow them to enter the broadband market without disrupting their core business processes. Being a service provider during this time of technological change is exciting, yet nerve-racking. Most service providers find it difficult to obtain the time and people needed to develop and launch new services that will help them achieve their business goals.



Narrowband ISPs are looking to increase revenue and profit by entering the broadband DSL market and need a solution today that enables them to make that transition.

The intent of this paper is to explain how smaller narrowband service providers can efficiently migrate toward the broadband service marketplace. Narrowband service providers face certain challenges and obstacles, including understanding their relationship with NAPs. The key to success in the broadband service marketplace is finding a solution designed to give smaller narrowband providers the head start they need to compete.

Embracing the Broadband Revolution

The telecommunications market continues to expand at an amazing pace. By now, everyone realizes the vast potential of the Internet to expand communications, provide entertainment, and increase commerce. Every issue of every major print publication contains articles on the Internet. Ads for most Fortune 500 companies display their web site addresses as often as their 800 numbers. This is the fastest-growing market/industry in the world, where change is not just a fact, but a way of life. Driving this frenzied pace for information gathering and sharing is the popularity of broadband technologies such as digital subscriber line (DSL), cable modems and wireless Internet

access. As consumer demands for faster access to information continue to skyrocket, these technologies give small and medium-sized enterprises (SMEs) access to high speed data that was once cost prohibitive. Of these technologies, the flexible and efficient nature of DSL service appears to offer consumers the most bang for their buck.

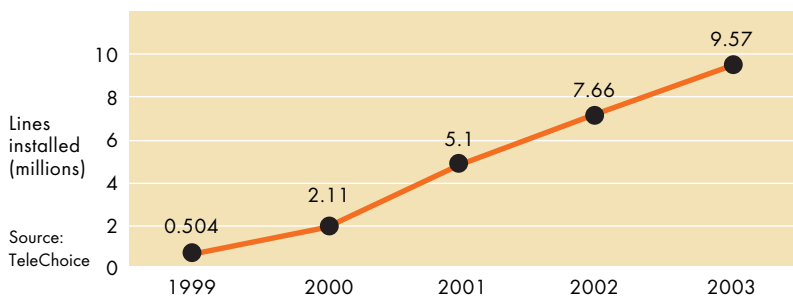
DSL Market Potential

Situated between the crawling 56 kb/s, V.90 dial modem and the expensive, dedicated data circuit, DSL is actually a hybrid of both technologies, as it provides high speed access over existing infrastructure at an affordable price. By the end of second quarter 2000, there were more than 1.2 million DSL lines installed, with expectations to exceed more than 9 million lines in just three short years! See Figure 1. This tremendous growth is a result of the efficient qualities that DSL offers – faster, affordable access to information incorporated over familiar technology. Such growth estimates may even be conservative because DSL, deployed over phone lines, promises to make its way into the voice services market this year.

Narrowband Market Today

Although consumers are rejoicing over the benefits of this broadband technology, not all ISPs are pleased with the effect it is having on the narrowband market. The access market is extremely competitive and highly fragmented. Current and prospective competitors include: national, regional, and local ISPs, including those offering free service; long distance and local telecommunications companies; cable television companies; direct broadcast satellite companies; and wireless communications providers. With so many providers vying for the customer's business, the ability to differentiate one's service and provide higher margin, value-added services becomes key to surviving in the marketplace. Narrowband ISP margins are continuously being restructured in order to remain competitive. See Table 1.

▼ **Figure 1: Domestic projections of DSL growth**



Therefore, with thin margins within which to work, narrowband ISPs face a difficult decision: do they change to accommodate consumer demands by adding broadband services to their product mix, or do they focus on new ways to develop and profit from narrowband services?

The question is not a difficult one to answer. According to *Computer Industry Almanac*, 11 of the top 18 U.S. ISPs, representing more than 63 million estimated subscribers, have added broadband services to their product mixes. Broadband is popular for many reasons:

- ▼ It is still a relatively young market that attracts smaller ISPs looking to gain a competitive foothold.
- ▼ The demand for services is soaring, which allows ISPs to realize healthy margins and meet profit goals.
- ▼ The flexible nature of broadband technology allows service providers to develop sought-after value-added services such as virtual private networks (VPNs) and voice over DSL (VoDSL).

It is clear that offering broadband services during such explosive demand is a business opportunity worth serious consideration.

Broadband Cost Considerations

Before rushing off to become a high speed broadband access provider, ISPs should keep in mind that this change does not come easily. On the surface, broadband services like DSL have rejuvenated the existing ISP marketplace, and in some cases have given ISPs the lifeline they need to differentiate themselves in a fiercely competitive environment. Consequently, it is no surprise that DSL is an attractive business venture, as it provides them with unique opportunities to capitalize on a very young and active marketplace. However, as promising as moving to the DSL market sounds, narrowband ISPs should consider all the associated costs to migrate efficiently from narrowband to broadband services.

▼ **Table 1: Margin analysis for a narrowband ISP**

Narrowband ISP with 50,000 Subscribers	Monthly	Yearly	% of Total
Subscriptions (\$16.95/mo.)	\$ 847,500	\$ 10,170,000	67%
Hosting/collocation (\$100/mo.) approximately 4%	\$ 200,000	\$ 2,400,000	32%
Ancillary Services – (Extra mail storage, site design, etc.)	\$ 14,000	\$ 168,000	100%
Total Revenues (U.S. dollars)	\$ 1,061,500	\$ 12,738,000	100%
Expenses			
NAP Charges – Virtual ISP service development and maintenance – (Per-user charge for aggregate 30 hrs/user/mo. – \$12.95)	\$ (647,500)	\$ (7,770,000)	61%
Labor – Includes 24 x 7 support and maintenance of RADIUS and site servers/software updates, etc. (\$60K/yr/per network administrator)	\$ (15,000)	\$ (80,000)	1.4%
Operations – Estimated staff of 20 to include CEO, CIO and COO	\$ (67,500)	\$ (810,000)	6.4%
Sales and Marketing – Involves bulk direct mail and web marketing, radio and television spots and ancillary advertising	\$ (253,500)	\$ (3,042,000)	23%
Total Expenses	\$ (983,500)	\$ (11,802,000)	91.8%
Operating Margin	\$ 78,000	\$ 936,000	8%

Today's Broadband Topology

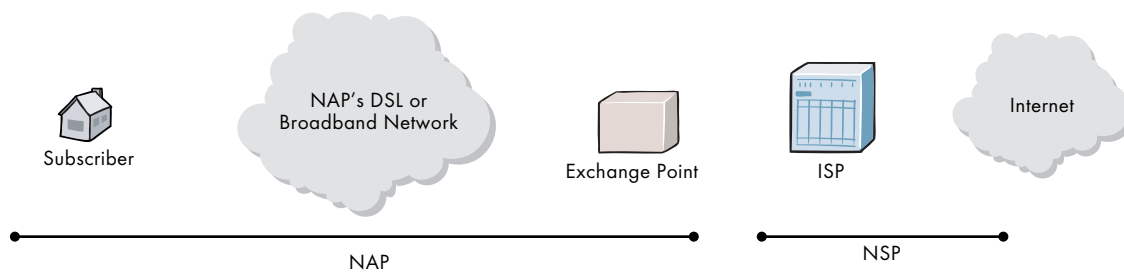
Surviving in today's broadband business model requires a successful relationship between the NAP and the network service provider (NSP). NAPs provide the backbone connectivity and control over core routers. Their product set usually involves some retail services, but they focus on providing wholesale connectivity to NSPs, which use these access lines to offer retail services to end users. Although NAPs have control over gateway traffic, NSPs provide more robust, value-added services to their clientele. This relationship benefits both parties. See Figure 2.

NAPs have realized that their core competency lies in providing and maintaining quality backbone connectivity. Although most access providers do have retail units that compete directly with other service providers, furnishing wholesale-over-retail connectivity gives them a more stable and predictable business clientele. Service providers benefit from the access provider function. Rather than spend a tremendous amount of capital and time developing their own backbone, NSPs can enter the market quickly and efficiently through existing access lines provided by NAPs.

But, for all its benefits, the partnership between NAPs and NSPs has had its flaws. When DSL service was initially deployed, providing wholesale connectivity and aggregating users through digital subscriber line access multiplexers (DSLAMs) was cumbersome and expensive. Only large, established service providers with millions of subscribers and deep pockets could afford to justify a migration to broadband. Since DSL was still a very young technology, there were no affordable solutions available for smaller service providers, thereby creating barriers to market entry.

However, there is always someone willing to create a solution to a problem. In just a short time, equipment manufacturers have developed more efficient alternatives that have been answering the requirements of smaller service providers for deploying broadband services. The outcome is a broadband access server (BAS) that allows access providers to offer better quality of service (QoS) while allowing service providers to enter the broadband market much more quickly and with lower capital expenditures.

▼ Figure 2: The NAP/NSP relationship



This business model has helped fuel society's craving for high speed access to information and the value-added services that come with it. More importantly, the model fosters competition by lowering the barriers to entering the broadband services market, which ultimately benefits end users.

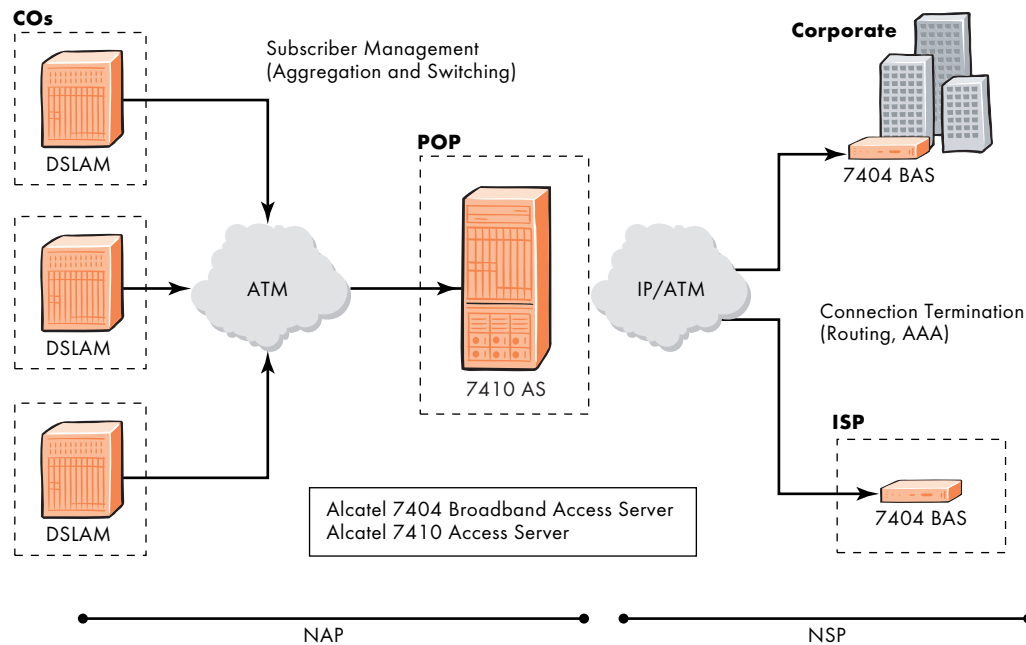
**Efficient Solutions:
Broadband Access Servers**

NAPs use broadband access servers to provide connectivity between DSLAMs and backbone routers. Functioning as a centralized point for managing subscribers and service providers, a BAS accepts connections from broadband providers and prepares traffic for entry onto backbone connections.

Using the right broadband server, NSPs can access a scalable network device to manage subscribers more efficiently and maximize revenue opportunities. See Figure 3.

To meet NAP requirements also, the BAS platform should support any DSL service architecture for business or consumer services. Likewise, the server should work with any DSL transport technology, such as ATM, frame relay and PPP, and it should be able to integrate both dialup and broadband access. NAPs also require a broadband server that supports the PPP over ATM model, L2TP and PPP over Ethernet for ADSL Internet access, and the Layer 2 bridged encapsulation and routed encapsulation architectures for SDSL service to corporate

▼ Figure 3: Broadband access server location and function



Most broadband access servers are not well suited for ISPs making the transition from narrowband to broadband. These ISPs need a BAS that is plug-and-play, that can turn up service quickly, that has the ability to manage DSL subscribers, and that does not require a major capital investment.

customers. The same platform should also support traditional dialup modem access, allowing NAPs to concentrate their service provisioning on one platform that combines dialup and DSL termination. Finally, the BAS should meet carrier reliability and safety requirements and also function as a core DSL solution that enables service deployment in any underlying environment. By using a flexible multiservice broadband access server, NAPs and NSPs can deploy a DSL infrastructure that fits readily into any existing operations environment for rapid service delivery.

Entering the DSL Market

Entering the DSL market can be a frustrating venture even for service providers requiring little or no change to their existing infrastructure. It can be an even greater challenge for smaller service providers. Most solutions that will enable a smooth transition to a broadband service platform are either costly or require technical resources beyond those of a small ISP. Faced with a lack of affordable solutions, smaller ISPs have been forced to play a waiting game that is now starting to negatively affect their overall business success. Before the emergence of broadband servers, finding a NAP that could support an ISP's existing network infrastructure with the least amount of upgrade was a challenge. In the past, it was common for service providers to be forced to implement

forklift upgrades to their existing infrastructure in order to comply with an access provider's topology and subsequent routing protocols. With NAPs holding the key to enter the lucrative broadband market, many service providers had no choice but to comply. This process caused service providers unnecessary cost and time burdens. Although many NAPs have made little or no change to their existing network topologies, the integration of today's broadband access servers has solved this challenge and therefore has fostered solid relationships between these two groups.

Today's broadband servers allow both access and service providers to meet complex requirements that were best served by numerous pieces of costly and cumbersome equipment only a short time ago. NAPs using a variety of different encapsulations to bundle broadband subscribers (PPPoA, PPPoE, L2TP, and ATM 1483B/R) can now offer service providers a least cost and fastest time-to-market solution without radical changes to their existing infrastructure. Therefore, with robust broadband servers currently supporting a variety of access topologies, service providers now have more freedom to select an access provider capable of meeting more specific requirements. One broadband access server capable of providing such robust features is Alcatel's 7404 Broadband Access Server (BAS).

What to Look for in a Broadband Access Server

Provisioning of end-to-end network services, especially end-to-end PVCs, is a laborious, time-intensive, costly and error-filled business process. Competitors offering faster customer-provisioning cycles continue to win business. As DSL services become more popular, scalability of DSL solutions, including the provisioning aspect, should be inherent in the deployment equipment. Therefore, to meet critical time-to-market guidelines, ISPs should focus on equipment that is compatible with their current system architecture. Items to consider are the equipment's ability to perform existing RADIUS hosting and subscriber management functions associated with most existing narrowband accounting procedures. By selecting one platform that is consistent with current technologies, ISPs are assured of achieving economies of scale when deploying future technologies.

NAPs and NSPs wishing to implement a BAS should investigate the following features before making a selection:

- ▼ Subscriber management
- ▼ Multibroadband access
- ▼ Seamless migration
- ▼ Simple provisioning
- ▼ Quality of service
- ▼ Value-added services
- ▼ Wholesale services

Subscriber Management

Surviving in the competitive broadband marketplace requires the ability to offer reliable connections and even better service. The broadband server that a service provider selects must provide end-to-end subscriber management features that are currently a part of its core business process. The server must be able to manage thousands of subscribers, as well as authenticate and bill them using the same operational tools as the ISP's existing dial network.

The broadband server chosen should include the following accounting and management functions:

- ▼ Accounting functions: RADIUS accounting, RADIUS extensions
- ▼ Management functions: SNMP, OSPF, frame relay, RIP, ATM, Ethernet, Syslog, ASCII configuration files

▼ Alcatel 7404 Broadband Access Server



Multibroadband Access

The primary business of NSPs is increasing their subscribership. Whether the broadband service is DSL, cable, LMDS, or a combination of all three, selling dependable Internet access is key to growing the service provider's business. Instead of deploying multiple platforms for multiple technologies, the most efficient method is to choose a platform that is already capable of supporting a variety of access networks. See Figure 4.

The following is a list of the various networks that a robust broadband server supports:

- ▼ ADSL, SDSL, IDSL, VDSL, G.Lite
- ▼ Fiber-based networks
- ▼ Cable networks
- ▼ Leased line
- ▼ Wireless broadband (LMDS)

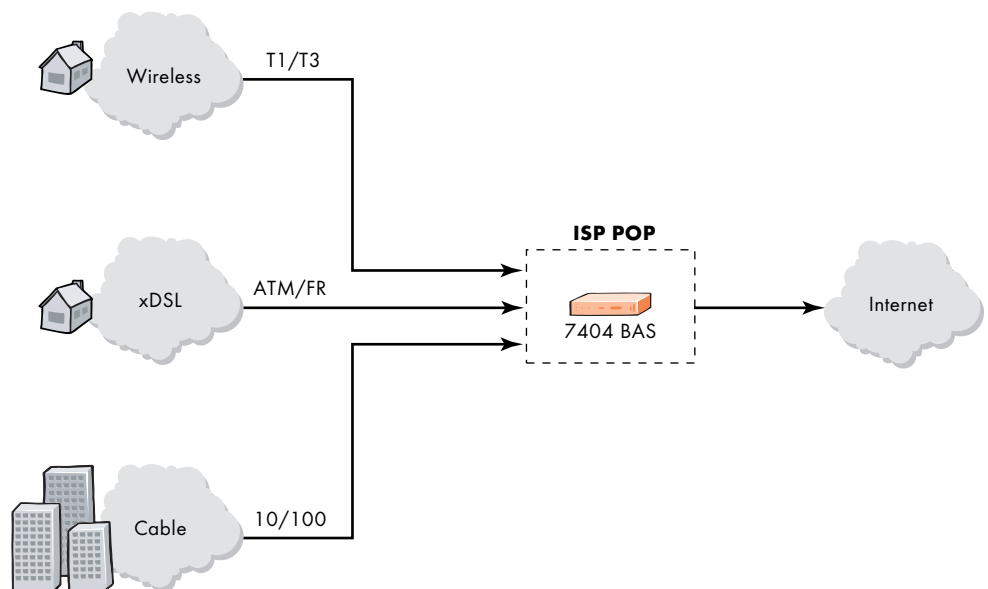
Seamless Migration

In today's competitive market, time-to-market is the difference between winning and losing a customer. Selecting a BAS that requires little or no change to a service provider's existing network infrastructure is critical to garnering valuable market share. Finding a broadband server that operates on similar narrowband facilities can help minimize the transition to offering broadband services.

Simple Provisioning

One of the biggest drains on a DSL strategy is the internal cost involved in deploying and servicing this new access technology. Between loop qualification, customer installs, back office support, circuit testing, and more, a service provider must look for equipment that can generate positive cost-efficiencies throughout its entire organization. The time it takes to provision new DSL infrastructure can pose a serious delay for an ISP wishing to capitalize on current demand. Therefore, service providers must select a tool that involves the lowest possible learning curve.

▼ Figure 4: Using multiple broadband access technologies



The equipment must be as easy to implement as is feasible, possibly using familiar interfaces so that the service provider's system administrators can quickly recognize and troubleshoot specific issues as they arise. The less time to configure hardware, the better.

Quality of Service

Ensuring consistent service quality has become a critical requirement for retaining an existing subscriber base. Selecting a broadband server that is consistent with the service provider's current QoS standards is a must. The broadband server selected should be able to handle thousands of concurrent sessions without performance drop-off. Also, in conjunction with the ISP's reporting processes, the broadband server should include the following indicators in the event of major/minor performance outages:

- ▼ System alarms: Power, critical, major, minor, alarm cutoff
- ▼ ATM port: Major, minor, normal, activity
- ▼ 10/100 ports: Link, activity, speed, duplex (half or full)
- ▼ Power-on self test

Value-Added Services

A profitable DSL service strategy includes future plans for enhancing revenues. Service bundling enabled by a multiservice platform is necessary to compete in today's DSL marketplace. A solution should enable multiple unique and differentiated services quickly, and allow for faster and easier provisioning of bundled services. Selecting a platform that is capable of running the following enhanced services is essential to generating additional revenue, as well as to creating a more brand-loyal customer:

- ▼ Voice services: VoIP, VoDSL, VoATM
- ▼ Video services: Video conferencing, multicasting, gaming services
- ▼ Security services: VPN service and support for most IPSec protocols (DES, Triple DES, PPTP)

Wholesale Services

NAPs are looking for a broadband access server to aggregate thousands of DSL subscribers to hundreds of VPNs. Access providers that offer their ISP and application service provider (ASP) partners enhanced connectivity services like DSL will enjoy success in their wholesale business divisions. Competitive wholesale DSL connectivity that can enable faster revenue-generating services for ISP and ASP companies is a strong edge in the battle with competitors.

Finding the right equipment to meet these key business requirements is the cornerstone of a successful DSL service strategy. As service providers look to vendors for DSL edge equipment, they expect solutions that meet their business needs as well as their technical demands. Alcatel understands that smaller NSPs have unique requirements when migrating to the broadband services market. By providing carrier class equipment and performance at an affordable cost, Alcatel is helping them overcome traditional market barriers, so that smaller NSPs can compete more efficiently, in order to make a difference.



Moving Toward Tomorrow

Eager to find new ways to increase profitability and brand loyalty, narrowband ISPs are scrambling to find ways to minimize time-to-market entry while keeping deployment costs low. Faced with declining market share and increasing competition, narrowband service providers must quickly implement a solution while the demand for DSL is still rising. They seek to offer a reliable broadband product and/or service that can be implemented rapidly and seamlessly without disrupting existing network infrastructure, that is capable of supporting value-added services, and that is provided in a painless-to-provision, affordable package. Such requirements to continue doing business would have been unheard of several years ago. These days, however, flexible and efficient technologies with these capabilities do exist and are fueling the Internet's rapid growth and development.

The decision to deploy DSL services is no small task. Failure to choose the correct platform can delay market entry and cause unforeseen changes to existing network architecture. Broadband platforms can be difficult to

implement and require additional expenditures if the original platform is not scalable. The results are often disastrous: any delay in market entry can compound the loss of potential revenues, lead to decreased quality of current subscribers, and cause unnecessary losses to already delicate margins. Unfortunately, it does not stop there; the error is usually passed on to consumers in the form of higher than average monthly subscription rates, which in turn can lead to higher churn as consumers seek a more affordable solution elsewhere. This usually causes a knee-jerk reaction as service providers then respond to latent demand rates by deploying new, and expensive, promotional strategies. This cycle can take years to overcome, and some service providers may never recover. Therefore, selecting a broadband solution from a manufacturer that understands the service provider marketplace and its diverse requirements is critical to the future of the service provider's business.

“Narrowband service providers face a turbulent future if they fail to plan for the future of broadband services.”

*Claudia Bacco
Vice President of Consulting
TeleChoice, Inc.*

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