Product information begins on page 2.

Lucent and Ascend have merged.

With the Lucent-Ascend merger, customers gain a broader and more powerful portfolio of next-generation data, voice, fax, and video services and products. To access up-to-the-minute information about our products, see page 2.

We also invite you to contact us with your questions directly at: info@ascend.com

Ascend

WHITE PAPER

Intelligent Networking Opportunities for CLECs

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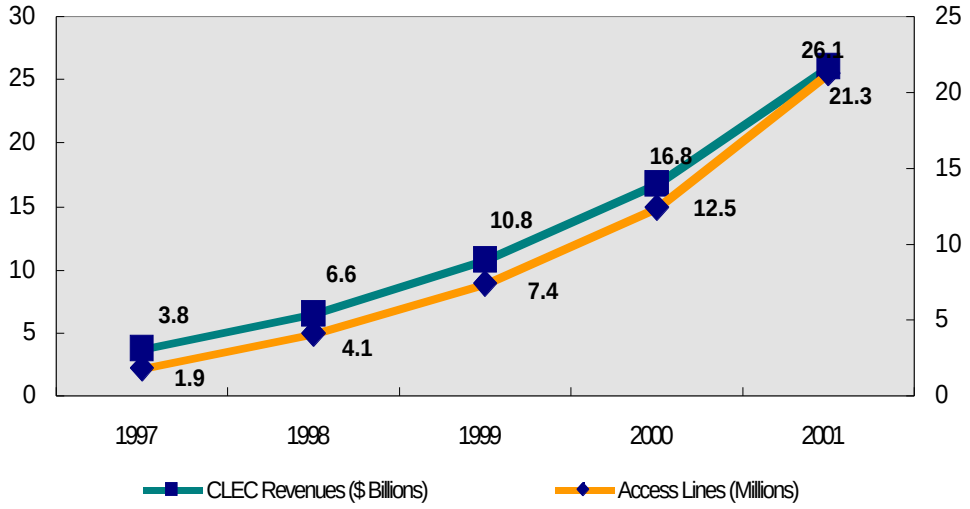
1. Executive Summary

The local switched services market is the last great competitive frontier in telecommunications. Competitive Local Exchange Carriers (CLECs) are scrambling to get their slice of the near $100 billion pie. The challenges are intense, but the rewards will be fantastic for those that are able to win the battle for customers and their local service dollars.

The CLEC market is exploding by all accounts. CLECs have gone from near obscurity to 4.1 million access lines in 1998 and are expected to grow to over 20 million lines by 2001 – from total revenues just under $7 billion in 1997 to over $26 billion in 2001. This growth will not happen by accident. It will occur when a select number of CLECs are



able to convince investors and customers that they are better than any other local provider.

Figure 1 – CLEC Revenues and Access Lines (Source: The Yankee Group 1998)

Convincing investors and customers will be done through the careful process of differentiation. CLECs that provide the best combination of product bundles, customer experience, customer care and price will rise above the other commodity-like providers. Investors are looking for returns and they know that the best returns will come from CLECs that deploy capital in areas that return cash fast – such as platforms that can be leveraged across multiple services and utilize the operations and customer processes already in place.

New customers will appreciate CLECs that are able to make the customer experience pleasant and hassle free. CLECs that design and implement processes around the latest in systems and technology will reap the benefits of smooth installations and fast trouble resolution. Customers will be drawn to the unique service bundles made possible through the deployment of multi-services platforms. They will also be amazed at the speed with which changes will be made to their various services.

Like CLECs, Intelligent Network (IN) technology has come a long way over the past several years. What was once the domain of only the very large incumbent local exchange carriers (ILECs) and interexchange carriers (IXCs) is now well within reach of the smallest CLECs. Through advances in IN technology, it is now possible for CLECs to offer services
like Virtual Private Network (VPN), Advanced Calling Services (ACS) and Caller Name Delivery (CNAM). Local Number Portability (LNP) can also be supported on the same platform.

Business customers are becoming more sophisticated and therefore more demanding of their telecommunications providers. Voice and data services at lower prices are no longer enough to lure the best customers away from an incumbent. A typical prospect may have a large corporate office complex, a call center and employees throughout the region that work from home. VPN and ACS services have been designed to meet this prospect's needs and provide the leverage required for a CLEC to acquire it as a long-term customer.

Financial models show that a fast growing CLEC serving 30,000 lines in 1999 will get a three year return on investment and enjoy operating margins in excess of 75% after four years. Those are the kinds of numbers that banks and investors like to hear and this analysis doesn't even attempt to quantify the acquisition and retention benefits that come about as a result of offering unique product bundles at competitive prices.

CLECs that were once forced to go to service bureaus can now afford to deploy their own in-house IN platforms and regain control of critical network functions. The benefits of ownership are clear. This white paper describes the profitable new business opportunities made possible by the latest in scalable, multi-services IN platforms.

2. CLECs – Going After Their Fair Share of the Local Market

According to the Yankee Group, the local switched services market was $98 billion in 1997. They also estimate that CLECs had already captured a 1.2 % share of that market. Yankee Group goes on to predict that CLEC local switched services revenues will grow to over $11.4 billion by the year 2001. In fact, local switched services are expected to make up the largest portion of CLEC revenues within five years.

A market this large was bound to attract a lot of players and the CLEC field is very crowded. From small to very large, resellers to facilities based, the spectrum is full. According to a Yankee Group study, by the end of 1998, CLECs had installed more than 4.1 million access lines and more than 300 Class 5 central offices. Given the explosive growth of most CLECs, it would not be unusual to see those numbers grow by 70% or more in 1998. The Yankee Group projects that CLECs will have installed over 21 million access lines by the end of 2001.

3. The Battle Is Joined

CLECs are embroiled in competitive issues on every front. As they battle to win customers from ILECs and other CLECs, they are also competing for capital from investors and financial institutions. CLECs have to continually balance the factors that attract new customers with those that motivate investors to contribute capital.

With the passage of the Telecommunications Act of 1996 and the subsequent implementation of local number portability (LNP), local telecommunications customers finally have a choice in service providers. Before LNP, a customer wanting to switch to a CLEC would have to change telephone numbers. For obvious reasons, not many customers switched their local service. With LNP, customers can now switch to a CLEC and take their number with them. But LNP only opens the door for CLECs. Walking through that door is wrought with another set of challenges altogether.

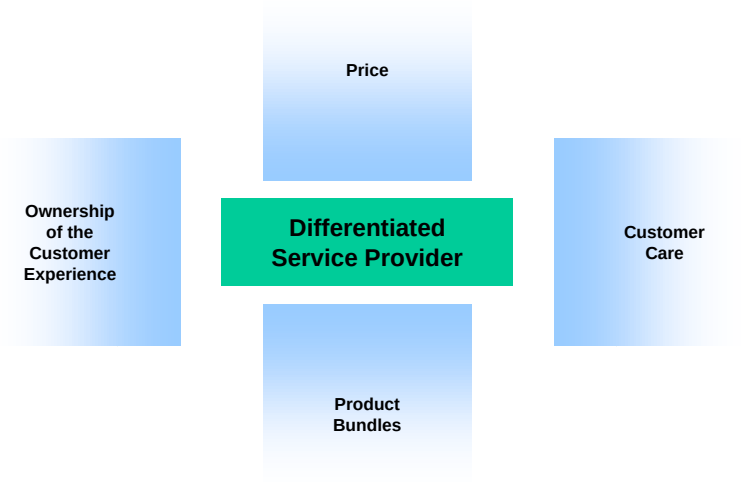
ILECs have been busy rolling out creative product bundles that include advanced services and attractive prices. They have done this with the advent of full local competition in mind. CLECs that do not have the capability to offer the same components in these product bundles (e.g. Calling Name Service, Voice Messaging Service, Call Waiting with Caller ID, High Speed Internet Access), will probably not get very far with the most advanced ILEC customers. The capability to offer these advanced services has become a "ticket to play" in the local switched services marketplace. The real challenge for CLECs will be to develop and introduce new services faster, better and cheaper than the ILEC.

Like end users, Wall Street is looking for value from CLECs. In other words – positive cash flow. Network investments that were once amortized over twenty to thirty years in the Bell System, are now expected to generate positive cash flow in less than five years. As a result, CLECs are being forced to use their investor capital opportunistically and only deploy facilities and equipment that will generate positive cash flow quickly. Investors have been kind to CLECs so far, but according to the Yankee Group, they expect to see CLECs producing income soon.

It can be said that the highest level of return can only come about through the assumption of a high level of risk. For CLECs and their investors, this means more facilities based and less resale based service offerings. It is therefore imperative that CLECs deploy platforms and facilities that support multiple services and fit seamlessly into their
existing infrastructure. CLECs cannot afford to develop special processes and systems to accommodate every
new network platform.

4. The Struggle for Differentiation

In a crowded field of competitors, those providers that successfully rise above the commodity clutter stand the best chance of flourishing. According to the Yankee Group, four factors will determine whether a provider will be able to differentiate itself effectively. These factors are the ability to offer products in attractive bundles, at fair prices, with premier customer care, and in a manner that leaves no critical element of



the customer experience in a third party's hands.

Figure 2 – Service Provider Differentiators (Source: The Yankee Group 1998)

CLECs were initially forced into the role of low cost (price) provider vs. the ILEC. This allowed them to secure a base market share and sustain their dedicated access line of business. But, as CLECs go after a much larger share of the local switched services market, other factors will play a larger role in the prospects' decision to leave the ILEC. The issue for the CLEC is not whether they can be the lowest priced solution, but whether they can deliver services at a lower cost than the competition. Lower cost of goods translates to higher margins, improved cash flow and more investor capital. Having the lowest costs also allows for pricing flexibility for strategic accounts and room to adjust pricing in the event of an all out price war.

Delivering local switched services can be an extremely complex process. ILECs have been struggling to improve their operations and customer care processes for years. Not to mention their operational support systems that were designed decades ago. Only bad things can happen when a CLEC relies too heavily on an ILEC for any element of the customer experience. Most providers have come to realize that the customer is best served by the CLEC owning every aspect of
the customer's installation, repair, billing, customer care, and product experience.

A premier customer care unit can be a secret weapon used to differentiate a new provider of local switched services. Customers will generally remember how they were treated in times of trouble and be more likely to pass along bad experiences to others rather than good ones. A good customer care team can help to limit those nightmarish customer anecdotes and even win the hearts and minds of customers through positive and hassle-free trouble resolution.

A whole can sometimes be greater than the sum of its parts. Research has shown that the more services a customer purchases from a provider, the less likely it will be to switch to a competitor. This is why energy providers have attempted to offer non-energy services like wireless services, satellite television and CO detectors. Like the ILECs, they are facing imminent competition and are trying to load customers up with product and service bundles. CLECs have to develop multiple product and service bundles to compete effectively. However, their ability to differentiate will depend on their ability to innovate quickly and economically.

5. Opportunities in IN Enabled New Services

CLECs can use the latest in scalable Intelligent Network (IN) technology to add three new services to their local switched services product bundle. Virtual Private Network (VPN), Advanced Calling Services (ACS) and Calling Name Delivery (CNAM) can all be supported by a single IN platform. The features and benefits of these three services are described next.

Virtual Private Network Services

VPN services are best suited for those businesses that need to connect a diverse set of locations on the same calling plan. The capabilities of Centrex and the PBX have been stretched to the limit with the proliferation of telecommuters, road warriors and other non-traditional office configurations. With VPN, virtually any size business can implement a private numbering plan. Employees on the road, working from home or at a branch office can use the VPN as if they were using a phone at the corporate office. The CLEC Intelligent Network manages all of the required integration with the PSTN.

In addition to number translation capabilities, businesses can take advantage of software defined user profiles. This feature allows each customer to create and modify user profiles for each individual station on the VPN. For example,
user profiles can be used by businesses to restrict international calling to certain employees or track phone usage using account codes. Changing user profiles could not be easier. Users have a choice of accessing their profile information over the phone or through an intuitive graphical user interface. Depending on privileges established by the administrator, users are able to configure their speed dialing and call diversion setting at any time. A more complete list of user profile options is provided in Table 1.

VPN can also save businesses time and money in the network by reducing the number of moves, adds and changes. Since VPN takes control of each incoming call, it effectively allows a corporate network to have a nationally/internationally available DDI number range to cover any or all stations on the VPN. Under non-VPN DDI, each PBX will typically have its own locally assigned DDI range. The main advantage of a VPN wide DDI range is the geographic independence for VPN DDI numbers. If a VPN user moves between offices, the DDI number can stay the same. An additional benefit is that it permits flexible charging for DDI calls to VPN.

Road warriors will appreciate the remote access capabilities of VPN. Remote access functionality allows VPN users to access their VPN features from any non-VPN phone. This involves the caller being validated prior to access to VPN functions to prevent fraudulent use. The validation process identifies the VPN, and the VPN originating profile that is to be used for all subsequent calls. The VPN is identified by the number dialed to access the remote VPN access function (typically a free phone number), the originating profile will be associated with a user ID that forms part of the validation sequence. The originating profile may be shared with a user's VPN station originating profile (the phone on their desk).

Once validated, a user is able to dial another VPN station using a virtual station address. If allowed in the originating profile, the user may also make off-net calls thus providing a type of calling card function. VPN features fall into one of two categories: those processed based on the originating caller, and those processed based on the terminating station or called party.

User Profile Option	Description
Allowed and barred lists	An allowed number list or a barred number list may be assigned to any originating profile. The list is composed of a number of private numbering plan pre-fixes. Any dialed number for which the first digits match the pre-fix will be either disallowed or allowed depending whether the list is a barred or allowed list respectively.
Divert on busy/no answer	A forward destination can be specified for incoming calls to a station that is busy or not answered after a number of seconds.
Off-net calling	For all originating station profiles, only calls to numbers within the VPN will be allowed unless the off-net calling feature is enabled in that profile. Off-net calling is more a permission to allow an event rather than a specific function.
Account code	Dialed numbers may be prefixed by an account code which will be removed from the dialed number, but included in the billing information for the call.
Variable routing	For trunk and international calls, different routing algorithms may be specified based on the destination of the call and a setting in the originating profile.
PIN coded security override	For profiles where barred or allowed lists exist or where the off-net calling feature is not enabled, a user may enter an ID and PIN to override one or both of these blocks on making the call.
Speed dialing	Each originating profile will have a configurable number of speed dial numbers. The typical implementation of a speed dial number will be a prefix identifying the number as a speed dial number followed by the speed dial index. For example, in a particular private numbering plan, ‘ 8’ may be used as the speed dial prefix and therefore 800 could be the first speed dial number.
Call transfer	A forward destination can be specified for incoming calls to a station.

Table 1 – VPN User Profile Options (Source: Ascend Communications, Inc., 1999)

Finally, administrators will appreciate the advances made in VPN management capabilities. Service providers determine the level of access customers can have to their VPNs. Businesses that prefer more control could be allowed to create and configure their own VPN profiles and routing between sites. Businesses that are not interested in such capabilities may be limited to allocating user IDs and PINs. Whether businesses are given full or partial access to their VPN configurations, a JAVA based Internet interface makes it easy to execute real time configuration updates.

6. ACS Advanced Calling Services (E800)

As with VPN, deploying switch based advanced calling services (ACS) like enhanced toll free, local toll and premium rate services (800/900) has not been affordable for small to mid-size service providers. CLECs that

deploy scalable Intelligent Network platforms can not only offer ACS services, but can also enjoy the profits that these services generate.

ACS capability enables CLECs to define a set of routing criteria that allows calls to be terminated to one or more destination directory numbers (DDN). The set of criteria that defines the routing of a call is referred to as a call plan.
A simple call plan might route calls to an announcement during the weekends and a phone number during weekdays. Every call plan is made up of several decision points or “feature nodes.” A select list of ACS call plan feature nodes is provided in Table 2.

IXCs have been offering this type of call routing service for years. However, significant improvements have been
made in the IN-based ACS service that make it much more appealing compared to the old switch based service.
For example, new service management capabilities now allow customers to create, change, and view their own call plans. Without the security features and centralization that come with IN, this type of customer access would be unthinkable.

ACS Feature Node	Description
Time of day	This node allows alternative call plan branches to be taken based on the current time of day.
Day of week	This node allows alternative call plan branches to be taken based on the current day of the week.
Day of year	This node allows alternative call plan branches to be taken based on the current day of the year.
Number dependent routing	Number dependent routing nodes operate on the details of the call made by the called party. This may be on the called party number (dialed number) or the calling party number (phone number that made the call).
Dialed number	The dialed number node allows a customer who has multiple 800/900 numbers assigned to manage these through a single call plan. The mapping of called party number to call plan through the customer number table allows for multiple numbers to use the same call plan.
Calling party routing	The node allows a call plan to be branched based on the value of the calling party number of a call.
Geographic (calling region)	This node is an enhancement to the calling party node. It allows a call plan to be branched based on the geographic location of a calling party.
Proportional routing	With the proportional routing feature node has between 1 and *n* outputs, calls are routed based on the number of calls that have been routed down each available terminating path.
Statistics	The statistics package allows the logging or counting of system and user definable events within the call plan to be achieved.
Event logging	Events can be logged to a file on each SCP for later collation and processing.
Event counting	Events can also be counted. The advantage of counting events over logging is that they can be collated and presented in real time. This makes the use of event counting very useful for services such as televoting.
Event count branching	A feature node to enable alternative call plan branches to be taken based on the value of a particular event count will be provided.
Unconditional termination	This feature node routes a call to a specified destination, provided that the destination has been entered in the allowed destination directory numbers table.
Play announcement	The play announcement feature node allows announcements to be

	played to callers prior to routing a call.

Table 2 – ACS Call Plan Feature Nodes (Source: Ascend Communications, Inc., 1999)

Call plan management capabilities also include the provisioning of call plan data and the association of a call plan and call plan data with dialed customer numbers. Best of all, a single tool performs all of these functions. A call plan editor also allows the collection and presentation of statistics generated using the statistics feature nodes with call plans. Statistics can be exported in a tabulated text format suitable for importing into other applications (Excel, Word etc.).

The limits of any individual customer's ability to perform call plan editing and analysis can be specified through a provisioning and configuration management interface. With IN based ACS, business customers no longer need to take the time and energy to submit complicated call plan requests to their service provider. For those customers that would prefer to leave call plan management to the CLEC, no problem. The call plan editing process is simple enough for call center representatives to manage.

7. Calling Name Delivery Service (CNAM)

Caller ID Service (Calling Number Only) has been around long enough to be considered a mature service. The same cannot be said for CNAM. ILECs have a leg up on CLECs when it comes to offering CNAM. First, they can service the bulk of their CNAM requirements out of their own databases. Second, the majority of names not residing in their own databases will most likely reside in another ILEC database. Reciprocal compensation agreements between the ILECs allow each ILEC to access out of region name information for virtually nothing.

Recent developments in IN based CNAM technology have made it more cost effective for CLECs to offer CNAM to business and residential customers. CNAM data can reside in multiple locations, depending on the given CLECs deployment strategy. For example, a CLEC could populate only local names in the main database and store out of area names on another database. The local database will be smaller and updated more frequently. It will also be accessed more frequently. Keeping local data separate from national data will improve access speeds and also streamline management and administration.

Local CNAM databases will store up to 20 million records, more than enough for a local calling area. Extended databases will store upwards of 200 million records. CLECs may find it cost effective to mix the use of purchased name databases with dip charges from out of region ILECs. It all depends on the nature of calling patterns into the CLEC customer base.
In the event that a name is not available in either the local or national database, the CNAM application will perform a look-up of the city and state related to the NPA-NXX. In instances where a city is not identified with a name, the application will return the State only.

8. The Intelligent Network Advantage

CLECs that plan to be around in five years have no choice but to deploy services like VPN, ACS and CNAM. The real question for CLECs is whether to implement a switch-based or IN-based approach. The general consensus in the telecommunications industry is that IN is superior to switch-based at almost every level. However, the main advantages
of IN are lower operational costs, survivability and rapid service creation capability.

Given a choice, most service providers would prefer to install, maintain, administer and repair fewer network elements and applications. It just costs less. For example, with IN technology an application only needs to be installed on a single pair of SCPs vs. several switches with switch-based technology. With IN, hardware maintenance and repair activity can be limited to just two sites. This allows service providers to be more efficient and save money on personnel.

Switches are typically placed close to the customers that they serve. This allows service providers to limit the cost of physical facilities (copper or fiber) required to interconnect customers to the switch. The penalty paid

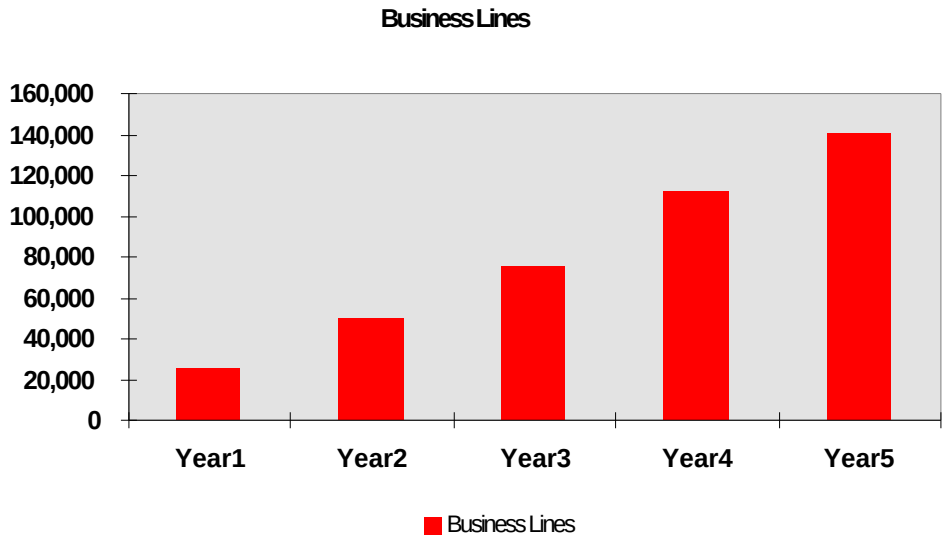
by service providers is the proliferation of multiple switches throughout a large geographic region. Statistically speaking – the more elements that there are in a system, the higher the probability of failure. Entire switches rarely fail, but applications within them can. Applications like VPN and ACS are not immune to failure, but customers that purchase ACS and VPN services will not accept service interruptions. CLECs that deliver IN based services that rely on redundant fault tolerant platforms can rest easy knowing that their customers' reliability expectations will always be met.

Rapid service creation and delivery is a hallmark of IN based technology. With IN, the "brains" of the network reside
in one logical location. This allows for real time creation and delivery of new services and service features. Customer service requests that required complicated processes involving different operational systems can now be executed instantly by one administrator. Customers who have had to live with the "pick any color as long as its black" routine from the ILEC, will be amazed at the speed with which they can have ACS and VPN services customized to fit their specific needs.

9. Sample CLEC Business Case

This section reviews the highlights from a sample CLEC business case for VPN, ACS and CNAM. To demonstrate
the opportunity for small CLECs, the model was run for a small fast growing CLEC. The resulting financial benefits
of deploying IN-based services prove that scalable IN platforms have arrived.

Figure 3 shows the CLEC subscriber base assumed for the business case. It was assumed that the CLEC ended the
first year of the plan with 25,000 business lines and grew modestly (for a CLEC) over the last four years. It was assumed that the CLEC business customers represented an average cross section of small, medium, and



large businesses. This allowed for the use of average call statistics, operational costs and service penetration ass" mptions in the financial model.

Figure 3 – CLEC Business Lines and Annual Growth (Sample CLEC Business Case)

Figure 4 shows the number of CLEC lines equipped with VPN, ACS, and CNAM services. Average penetration assumptions were used in the business case. The adoption of CNAM was assumed to be very high because of the awareness and demand already created by ILEC offerings. Demand for VPN and ACS grows at a slower pace due to the complex nature of the products and the need to establish strong account relationships prior to large volume sales.

Figure 5 shows the revenue generated from each service. Revenue tracks very closely with demand. This is because it was assumed for this case that VPN, ACS and CNAM would be priced on a per line basis with similar rates. Per minute pricing could possibly be considered for some aspects of VPN and ACS, but was not considered as part of this case.

The line in Figure 5 shows the financial outcome for the sample CLEC business case. This chart reflects the bottom line advantages of deploying IN based services. Operating income goes positive after two years, cumulative cash flow goes positive after three years, and revenue growth outpaces expense growth for the entire plan. This shows from a quantitative perspective that economies of scale are working for this CLEC.

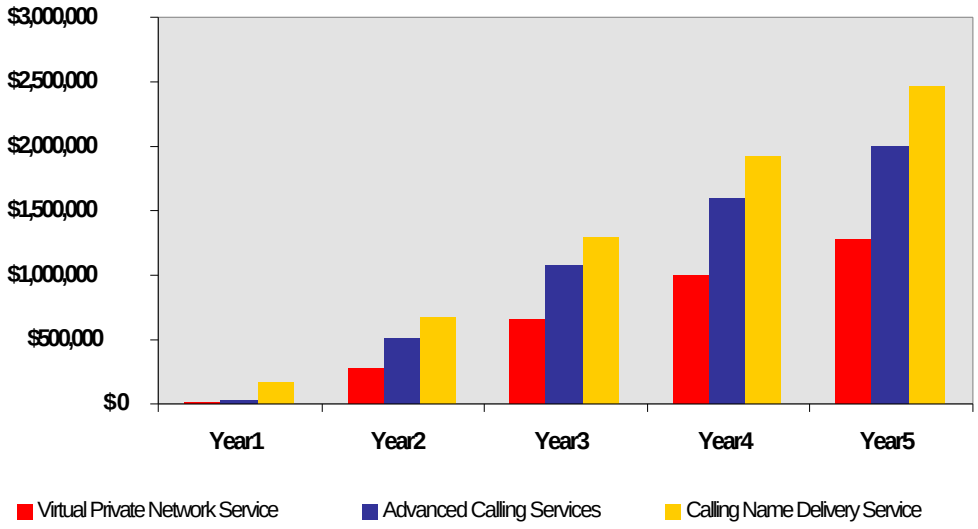
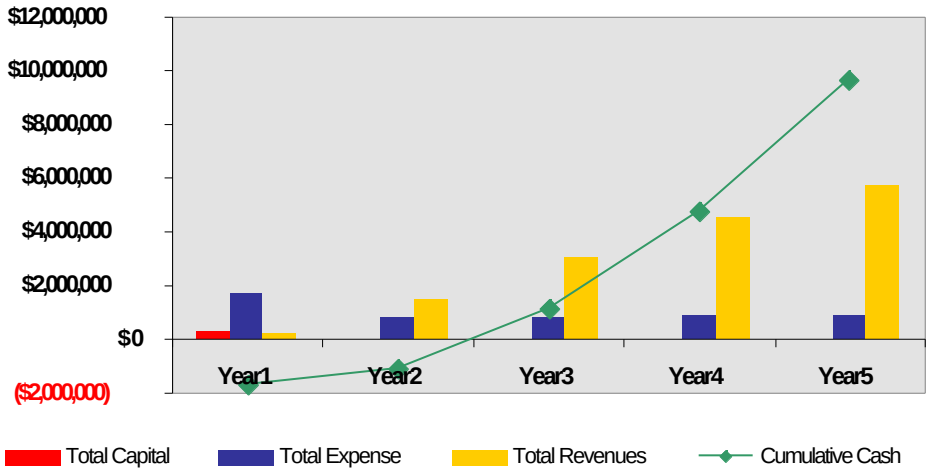


Figure 4 – VPN, ACS and CNAM Features (Sample CLEC Business Case)

With some telecommunications services, expense might grow at the same rate as demand and revenue. This case shows that an IN platform is more like a jumbo jet for an airline. Aside from food and refreshments, it probably costs about the same amount for United Airlines to fly a 757 with 25 passengers as it does for 150. The more passengers it seats on each flight, the lower cost per passenger. The same is true for IN. Once a CLEC justifies the investment in an IN platform based on known set of services, the jet is paid for. That means that the next round of IN services need only bear the *incremental* cost of deployment. This allows the provider either to establish a cost leadership position and capture market share or offer the



service at market price and maintain cash flow for future investment.

Figure 5 – Capital, Expense, Revenue and Cash Flow Summary (Sample CLEC Business Case)

10. Partnering with Ascend

Ascend Communications, Inc., (NASDAQ: ASND) is a leading provider of wide area network (WAN) and Intelligent Network (IN) technologies for the next-generation public network—a packet-based infrastructure that integrates data, fax, video, and voice communications. The company develops, manufactures, sells, and services WAN solutions for telecommunications carriers, Internet service providers (ISPs), and enterprises worldwide. Its comprehensive, best-of-breed solutions enable high-performance, cost-effective connectivity from the core of the service provider's network to the end user's WAN access point. Founded in 1989, the company now employs more than 2,500 people worldwide and its products are distributed in more than 40 countries.

Market Leadership

- 27 of the world's top 30 carriers rely on Ascend for data, voice and Intelligent Network systems.
- Ascend systems route the vast majority of AT&T 800-number calls.
- Ascend equipment supports more than 30 million internet connections daily.
- Ascend is the leader in WAN Frame Relay switches with over 40% market share.
- Ascend is the leader in ATM core switches.
- Most widely used HLR platform with over 30 million subscribers worldwide.

Products

With Ascend products, service providers build the network infrastructure to offer enhanced voice and data services and to connect enterprise customers to these services. Ascend's Carrier Signaling and Management Division (CS&M) leverages carrier-class, fault-tolerant based Intelligent Network (IN) solutions and Signaling System 7 (SS7) technology. CS&M Division has taken the lead in building the next-generation public network by introducing the first commercially available, standards-based SS7 gateway (Internet Call Diversion) product.

Ascend Delivers the Intelligent Network Advantage

New concepts of service delivery, increased competition, new technologies, and government deregulation continue to bring unprecedented change to the telecommunications industry. Across the wireline and wireless markets, plus the new frontier of VoIP, service providers are searching for ways to meet new challenges and capture emerging opportunities.

That's why more and more telecommunications service providers are using computer-based IN solutions to introduce leading-edge services faster and more cost-effectively. By deploying services independent of telecom switches, carriers are gaining unprecedented flexibility to launch competitive new services and respond to change, while maximizing return on their investments in switching equipment and network infrastructure.

To thrive in the emergent telecommunications marketplace, service providers need to offer one-stop shopping for
a diverse array of customer-oriented capabilities. They need to differentiate themselves from the competition by developing new services and new service delivery methods, by integrating their offerings in multifaceted service packages that have immediate customer appeal, by bringing these products to market quickly, and by pricing them competitively. Plus, service providers need to position themselves for the evolving next-generation public network.

A Sustained Record of Success in Intelligent Networks

Ascend IN customers come from the ranks of the world's leading telecommunications service providers – including CLECs, PTTs, RBOCs, inter-exchange carriers, independent carriers, equipment suppliers, and wireless/PCS providers.

Ascend – Delivering IN Solutions Across Service Providers Networks

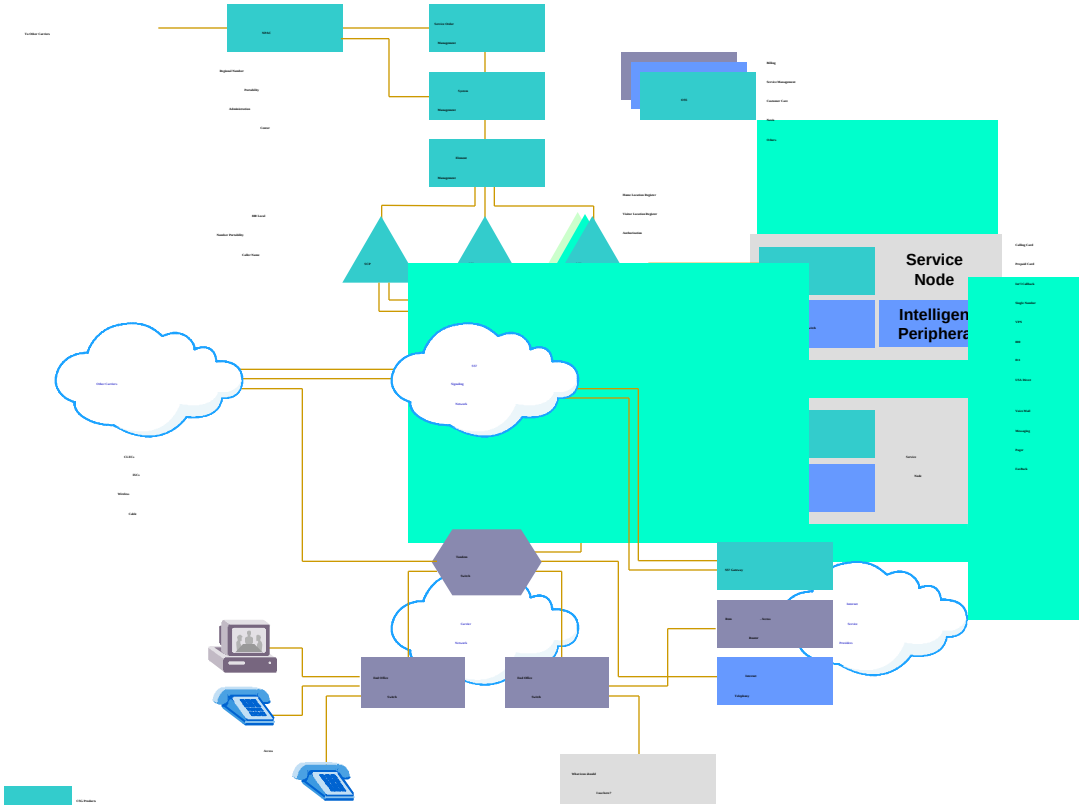


Figure 6 – Ascend delivers the Intelligent Network advantage across all service provider networks – PSTN, Wireless, PCS, VoIP to the Next-Generation Network, integrating voice, data, video, and fax services.

Ascend provides open, telecommunications-specific platforms consisting of hardware and software building blocks for implementing network elements, operations and administrative support systems, and advanced network management functions. These include Service Control Point (SCP) database engines; Service Node (SN) and Intelligent Peripheral (IP) platforms for delivering diverse voice, fax, and information services; Service Management System for maintaining the master database of IN functions; and a rich Service Creation Environment (SCE) for developing and deploying high-demand, revenue-generating applications. Its software platforms are built to internationally accepted Signaling System 7 (SS7, C7), European Telecommunications Standards Institute (ETSI), American National Standards Institute (ANSI), and Bellcore Advanced Intelligent Network (AIN) specifications.

These carrier-grade platforms provide a robust foundation for Ascend's growing portfolio of computer-based, IN solutions – Internet IN, number portability, Home Location Register (HLR), and enhanced services.

Ascend – Delivering Comprehensive IN Solutions

- Open, standards-based platform
- Continuously available
- Central office-compliant
- Proven SS7 middleware
- Rich service creation environment – ease of adding new applications
- Systems integration and comprehensive support

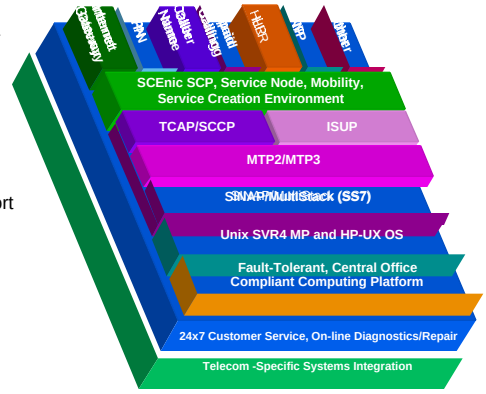


Figure 7 – Intelligent Network solutions leverage Ascend's leadership position in remote access and ATM solutions. As a result, Ascend is uniquely positioned to build next-generation network solutions from the carrier level through to the enterprise. With the Ascend IN applications, carriers can deploy revenue-generating services on a single, open, fault-tolerant, carrier-class platform within PSTN, wireless, PCS, and emerging VoIP networks.

The Ascend Advantage

· Proven CLEC business partner
· "Start SMART and GROW" packages
· Flexible financing
· World-wide professional services organization
· Business, marketing and technical consulting
· Turnkey solution provider
· Training
· Mission-critical 24 x 7 support

Today, Ascend has taken the lead in building the next-generation public network by introducing the first commercially available, standards-based SS7 gateway product. Already in field trials at leading service providers around the globe, the gateway works with Ascend's market-leading MAX TNT WAN access switches to provide the industry's only end-to-end solution for transparently routing calls between voice and data networks.

> *"The next-generation networks of service providers will be high-bandwidth, data-based networks that will be highly reliable and available while operating at reduced costs. They also will need to offer high-grade voice quality over data networks.*
>
> *The integration of Intelligent Network capabilities from the circuit-switched voice network into packet-based data networks will enable traditional phone services, including local number portability and 800 services to exist on the next-generation network".*

Mory Ejabat, Ascend Chief Executive Officer

Where Network Solutions Begin™

Worldwide and North American Headquarters
Ascend Communications, Inc.
One Ascend Plaza
[illegible] Harbor Bay Parkway
Alameda, CA [illegible], United States
[illegible]

European Headquarters
[illegible]

Asia-Pacific Headquarters
[illegible]

Japan Headquarters
[illegible]

Latin, South America and the Caribbean Headquarters
One Ascend Plaza
[illegible] Harbor Bay Parkway
Alameda, CA [illegible], United States
[illegible]

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