Opening the door to a world of opportunity...

Tandem and International Gateway carriers must meet several requirements for business success...

- Minimal Start Up Costs
- Fast Time to Market
- Signaling Flexibility
- Low Cost of Ownership
- Enhanced Services
- Ease of Use
- VoIP Capabilities
- High Reliability

See how Excel Switching can open the door for you...

EXCEL
SWITCHING

In today's telecommunications marketplace,

both established carriers and new entrants can count on only three things: constant change, huge opportunities and formidable challenges. Some of the most important changes affecting the telecom market are occurring in the policymaking arena, as deregulation continues to open domestic and international barriers to market entry. A global telecom market is gradually emerging from the discrete market segments previously found within individual countries.
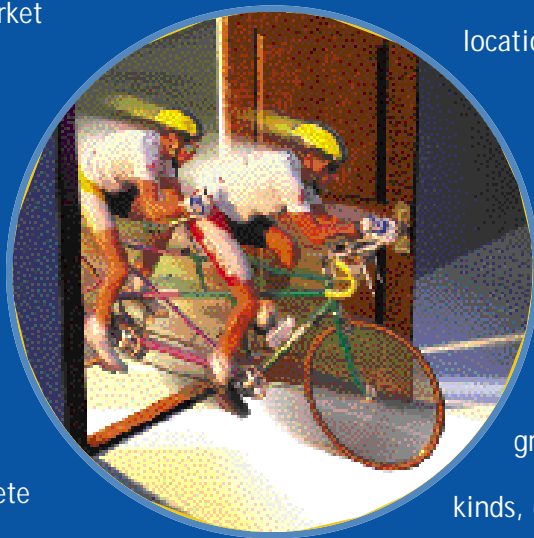
Equally important are widespread changes in technology. The popularity of the Internet and the convergence of voice and data networks are stimulating the rapid development and deployment of IP-based technologies. These changes, combined with advances in wireless technology, enable carriers to reach more and more customers, including even those in remote locations of the world.

Technology's longer reach and ever-expanding capabilities, in turn, are bringing about changes in what customers want. Driven by their growing reliance on information of all kinds, corporate end users and individual subscribers alike demand an increasingly complex mix of communications services.

Opportunity in Abundance

The second predictable aspect of the ongoing, rapid evolution in telecom is the enormous business opportunity for service providers of all kinds. Among the factors fueling the rising demand for communications services are:

- Transformation of regional and national economies into a global marketplace;
- Deregulation and the resulting increase in the number of market players; and
- The tremendous popularity of the Internet for Web-surfing consumers and for corporations that increasingly rely on electronic commerce, intranets and extranets.

According to studies by Forrester Research, Inc., a Cambridge, Mass., market-research firm, the combined European and United States e-commerce market is expected to be worth more than $270 billion by 2001, up from about $6 billion last year. Forrester studies also reveal that more and more consumers will demand broadband access to the Internet. The firm expects the number of bandwidth-hungry consumers to increase from about 500,000 at year-end 1998 to more than 3.5 million in 2001—and that their spending for higher bandwidth will grow from $122 million to $1 billion.

Looking at the opportunities from another perspective, various industry studies predict that international voice traffic will grow at an annual rate of 10 to 15 percent over the next decade. While that is considerable growth, it will pale in comparison to the expected surge in global data traffic. According to studies by KMI Corp., a market-research firm in Newport, R.I., data traffic will continue to grow at its current 85 percent annual rate until 2004, when it will slow to about 60 percent per year.

Most likely, the majority of this exploding market will go to those players—IXCs, CLECs, ISPs, resellers, and more—that anticipate change and are the first out of the gate to deliver cost-effective transport technologies and enhanced services. These services not only create additional revenue streams but also distinguish these early providers from their competitors, attracting more customers and ensuring continued marketplace success.

Rapid Changes Present Some Tough Problems

The third "given" in today's dynamic marketplace is the fact that all carriers must contend with many operational and competitive challenges. For example, many carriers are just entering the market, yet most of their infrastructure choices are systems built for incumbent carriers. These systems usually have large port capacities that are excessive for carriers who have yet to establish a customer base. Purchasing these systems can create high startup costs that make profitability difficult for most carriers.

Another challenge for carriers is entering international markets. Different countries present substantial opportunity; however, most have their own in-country signaling variants that can make compliance difficult when signaling is hard-coded into the infrastructure.

Time to market is also a problem for both new and existing carriers. One service provider said, "Typical delivery times in our industry are 60 days to nine months. With venture-capital funding, you could be out of money before deployment, so speed of execution is important to us." Just getting the infrastructure is only one of the time to market obstacles. Once the equipment is received, lack of signaling flexibility can cause even greater delays.

Operational costs can be daunting to new carriers trying to make a profit. Facilities are difficult to find and must be paid for monthly, based on sq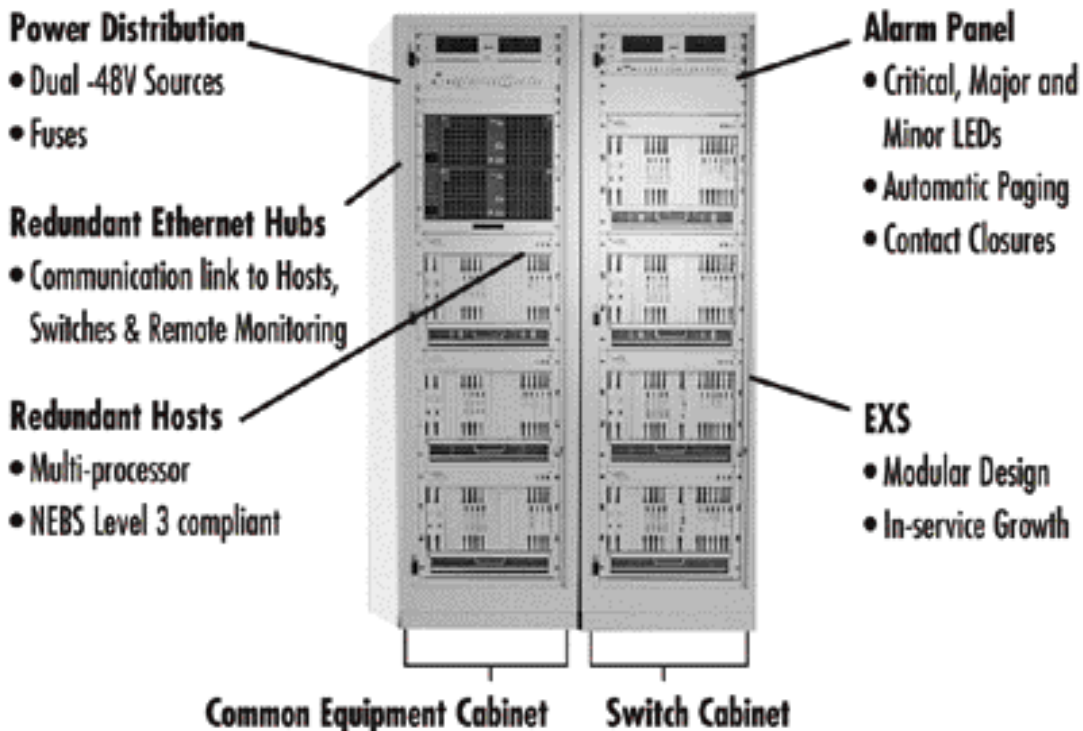uare footage. Additionally, expenses are incurred for power consumption, cooling, and some systems even require additional floor support, all of which add up as the size of the system grows. Low system reliability is another issue for carriers that may require on-site personnel at all times, further increasing operational costs.

System complexity is another factor that can create substantial expenses. Some systems can require up to seven people to deploy and require engineers on-site at all times to make routing changes and other system modifications. This complexity makes it difficult for carriers to closely control and monitor revenue streams.

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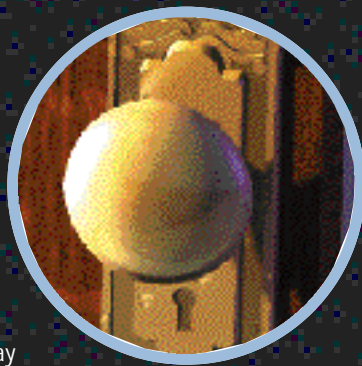
Carriers can try to compensate for these costs by increasing profit margins with enhanced services and voice over IP (VoIP) technology. However, many systems are closed to third-party services, requiring carriers to seek the mass-market services offered by the infrastructure vendor. This provides little differentiation and choice to carriers. With all these challenges it can be difficult for carriers to find the right solution that satisfies its needs and supports intergrated circuit and packet based switching.

EXS ExchangePlus

Power Distribution
- Dual -48V Sources
- Fuses

Redundant Ethernet Hubs
- Communication link to Hosts, Switches & Remote Monitoring

Redundant Hosts
- Multi-processor
- NEBS Level 3 compliant

Alarm Panel
- Critical, Major and Minor LEDs
- Automatic Paging
- Contact Closures

EXS
- Modular Design
- In-service Growth

Common Equipment Cabinet   **Switch Cabinet**

EXS® ExchangePlus Opens the Door for You...

To help carriers and service providers overcome such problems and ensure they can open the door to opportunity, Excel Switching Corporation has developed EXS ExchangePlus. As a turnkey solution, EXS ExchangePlus is a full-featured "out-of-the-box" tandem and international gateway switch that can help carriers get to market quickly. The open, flexible and scalable architecture of the EXS ExchangePlus solution gives service providers what they need to remain competitive and profitable. These include:

- Patented signaling flexibility for easy creation and modification of in-country variants
- Rapid deployment of new and differentiated services
- Voice over IP capabilities for cost-effective call transport
- Scalability to streamline costs with bandwidth needs
- Ease of use and detailed reporting for close monitoring and system control
- Reliability to protect revenue streams
- Low operational costs for high profitability

...and Gives You Everything You Need to Succeed

These advantages within EXS ExchangePlus can result in overall reduced costs, increased revenue and fast time to market both for initial market entry and the integration of enhanced services. This can make the difference between success and failure in today's ultra-competitive tandem and international gateway market.

Worldwide Signaling Flexibility

With the telecom market rapidly becoming global in scope, carriers often incur deployment delays and substantial cost—both in time and money—for in-country signaling development. Variants often cause substantial deployment delays in systems that hard-code their signaling because when the system does not comply based on the specification it must be returned to the lab for further development and testing. The process of returning to the field for each new compliance attempt increases deployment costs for development and personnel expenses, not to mention the impact on rollout schedules.

EXS ExchangePlus overcomes these obstacles with its patented software flexibility called EXS Signaling. This software tool enables both the vendor and carrier to access signaling from a higher level, so that

modifications can be made without altering internal system code. This allows in-country variants to be created and easily modified with minimal testing and without complex and lengthy re-design and deployment.

Finally, EXS ExchangePlus gives carriers control of their own destiny. Now carriers can either request new variants or create their own if they choose, releasing them from reliance on others to meet rapid rollout schedules. Additionally, carriers can take advantage of the large number of signaling protocols and variants already created for EXS systems, which have been deployed in over 70 countries worldwide. The end result is a system that can be deployed within weeks regardless of the signaling requirements and the flexibility to respond quickly to changing signaling needs.

New and Differentiated Enhanced Services

To increase profit margins, carriers often look to quickly deploy enhanced services. However, when it comes to being first to market with new services, both new and established carriers confront major obstacles: long lead times for new services and the lack of customization and differentiation once they are available. EXS ExchangePlus overcomes these obstacles by providing a number of cost-effective ways to integrate off-the-shelf, third-party and customized enhanced services quickly and easily.

Carrier-Class Multi-Protocol Programmable Media Gateway
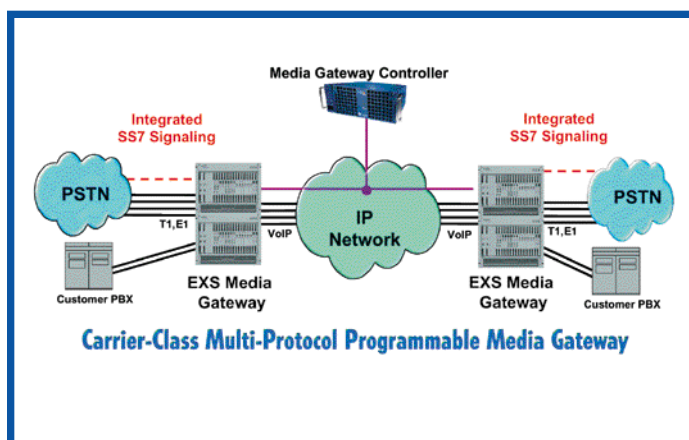
EXS ExchangePlus enables the integration of off-the-shelf enhanced services over an industry-standard IP backbone. This allows carriers to choose from industry-wide development of IP-based services and quickly integrate them into the EXS ExchangePlus solution. The system's IP abilities also allow carriers to be first to market with new, innovative combination voice/data services such as unified messaging and text-to-speech. IP service integration provides additional benefits in that switching calls over IP prevents the application from consuming revenue-generating PSTN ports, thereby maximizing both system and application capacity.

Third-party applications can be easily integrated into the EXS ExchangePlus solution via Excel's numerous enhanced service partners. Partner services have been key to Excel's success, providing advanced systems with flexibility to adapt to carrier needs. Partners will often customize applications for individual carriers or provide tools that allow the carrier control over system functions. For example, some partner applications use EXS flexibility to change the language of voice prompts with simple high-level, point-and-click operations. The many

EXS-based partner applications further enhance a carrier's ability to rapidly deploy even the most sophisticated services.

EXS ExchangePlus also provides a high-level API that allows carriers to create their own customized enhanced services to address their specific market segments. This allows carriers to truly differentiate themselves with unique enhanced services that only they can offer.

Carriers can also deploy a combination of customized, multi-vendor, and off-the-shelf applications to specifically address their enhanced service needs. This flexibility assures that carriers can select best-of-breed applications to increase revenue potential quickly and easily.

# Voice over IP for Cost-Effective Call Transport*

In addition to integrated IP services, EXS ExchangePlus supports voice over IP capabilities for call transport. Typical circuit-switched calls consume 64 Kb regardless of the amount of data crossing the channel. Converting these calls into IP packets compresses voice for greater throughput and only transmits actual data, preventing conversational silence from consuming bandwidth. This significantly condenses voice traffic enabling up to ten times the traffic in the same amount of bandwidth. This results in greater capacity, allowing carriers such as resellers to provide:

- More cost-effective call transport for individual customers, increasing market competitiveness to attract new customers; and
- The ability to support more customers with the same amount of bandwidth

EXS ExchangePlus provides flexible voice compression algorithms, allowing the carrier to choose from a factor of two to 10 times for best quality of service. Voice compression is assigned on a per call basis and can be modified while the call is active, providing granular control over system compression needs.

Carriers can also get to market quickly by taking advantage of the minimal regulatory restrictions on IP services. Using EXS ExchangePlus initially only for packet transport enables carriers to begin generating revenues immediately while completing the certification processes required to provide circuit-switched services, too.
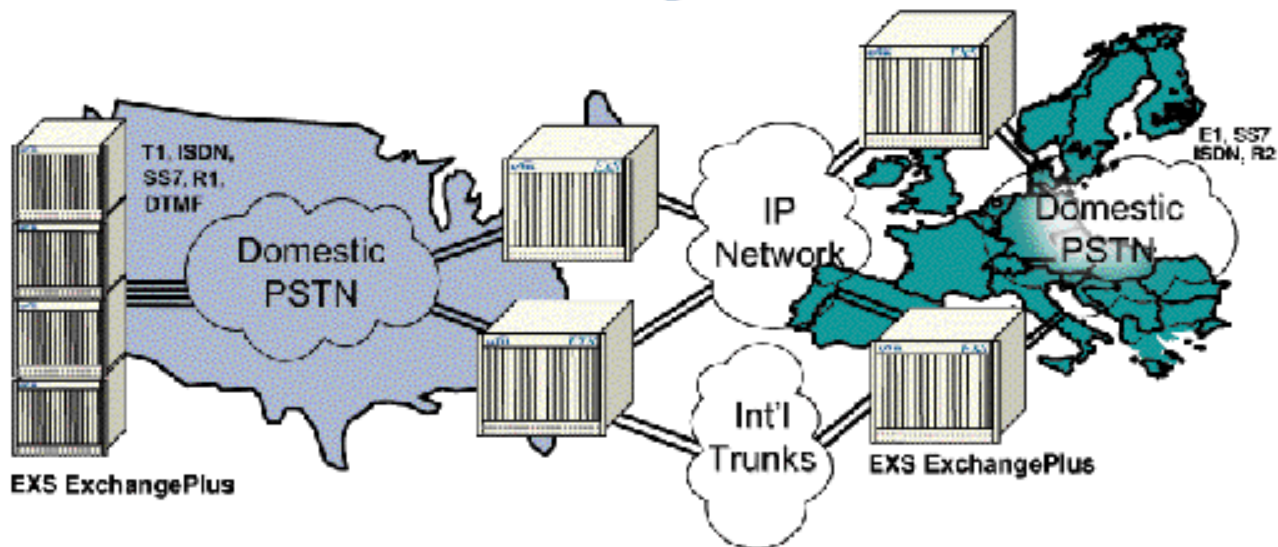

* VoIP expected availability first quarter 2000.

Scalability to Reduce Start-up Costs and Grow with Business Success

Scalability is one of the most important factors in minimizing start-up costs. New and emerging carriers are often limited to the same large switching systems provided to incumbent carriers. These expensive high-capacity systems can support the carrier's growth, but are typically underutilized before customer bandwidth demands come close to system availability. In the meantime, carriers must finance excess capacity up front and pay interest while the system depreciates. Furthermore, facilities are harder to find, power consumption is greater, cooling requirements are higher, additional floor support is often necessary, and monthly facility charges paid by the square foot also limit profitability. For emerging carriers these expenses can make the difference between success and failure.

EXS ExchangePlus can help emerging carriers succeed by providing scalability, enabling the system to start with low-port capacities and grow in small increments to keep costs closely aligned with business demands. EXS ExchangePlus can start at only 192 ports and grow to support more than 30,000 non-blocking ports.

The initial system starts with the Common Equipment Cabinet which includes redundant hosts and scales from 192 to 4,000 ports. Capacity can be increased by adding Switching Cabinets which scale from 192 to 8,000 ports. This allows up to 12,000 ports in a compact dual-cabinet design and up to 30,000 ports per system. Additionally, the system can be configured for density to consistently minimize the footprint. For example, the system can be deployed with 16-span line cards with only two spans purchased and activated. Once additional capacity is needed, the carrier can activate additional spans through software keying rather than replacing, exchanging or increasing system hardware, providing ease of growth and manageability. EXS ExchangePlus can also increase capacity seamlessly without service interruptions to protect revenue streams.

This dense footprint can translate into significant savings in operational costs. For example, one carrier was able to double its capacity with one 19-inch-wide rack over the previous system which required five 32-inch-wide racks. This resulted in reduced power consumption from 200 to 20 AMPS, considerable reductions in cooling expenses, elimination of structural enhancements and an 88 percent reduction in monthly billable facility space. This significantly increased the company's profitability, helping it meet stringent business objectives.
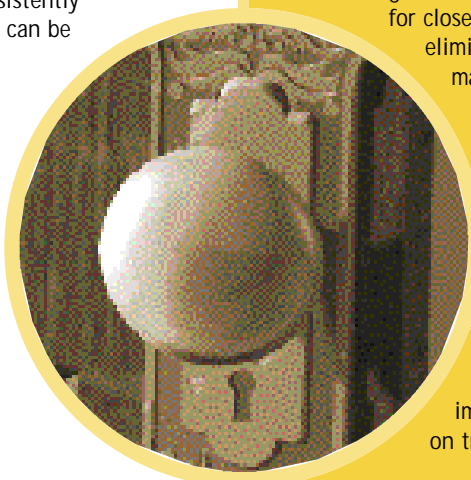
Ease of Use for Powerful System Control

EXS ExchangePlus provides an easy to use graphical user interface (GUI) for all system functions controlled by the user. Some of these include: routing, reporting and operations, administration and maintenance (OA&M).

The routing capabilities for EXS ExchangePlus are sophisticated, yet easy to implement and modify. One service provider's CEO said, "Even I can change routing tables with Excel." This service provider typically waited a week for routing changes; however, EXS ExchangePlus enabled the carrier to implement routing changes within hours. This translates into greater system control, increasing the carrier's ability to satisfy the needs of its customers.

EXS ExchangePlus provides flexible routing criteria such as day-of-week, time-of-day and least cost/best quality. Numerous hunting algorithms are also available, some of which include round robin, low-to-high, high-to-low and even/odd circuit identification code (CIC). The system also features 20 trunk groups per route list and trunk-group partitioning, which sub-divides the switch and thus assigns independent routing and translation tables to discrete traffic segments. For resellers, this means that each customer can feel like they own a portion of the switch, increasing customer service and carrier control over routing and management decisions.

As part of its ability to support any international numbering plan, EXS ExchangePlus provides 23-digit translations and smooth interworking between signaling variants. Carriers can modify routing tables in real time, as well as access them remotely for close system monitoring. This can reduce or eliminate the need for on-site personnel, reducing maintenance costs.

The Web-based reporting capabilities are detailed and include statistics such as inbound; outbound; outseize; connected; answered; route; trunk group; and percent-answered. Reports can be generated as often as every minute, allowing carriers to closely monitor traffic conditions. This means carriers can accommodate changing business conditions and protect their margins by quickly implementing routing changes and reporting on traffic.

EXS ExchangePlus OA&M capabilities enable carriers to set up, maintain and provision the switch quickly and easily. The SNMP agent provides easy integration into network operations centers or other central management systems. The system also has an alarm panel interface and a dry contact alarm. This alarm panel allows the switch to be programmed to page support personnel when it detects critical errors.

EXS ExchangePlus GUI
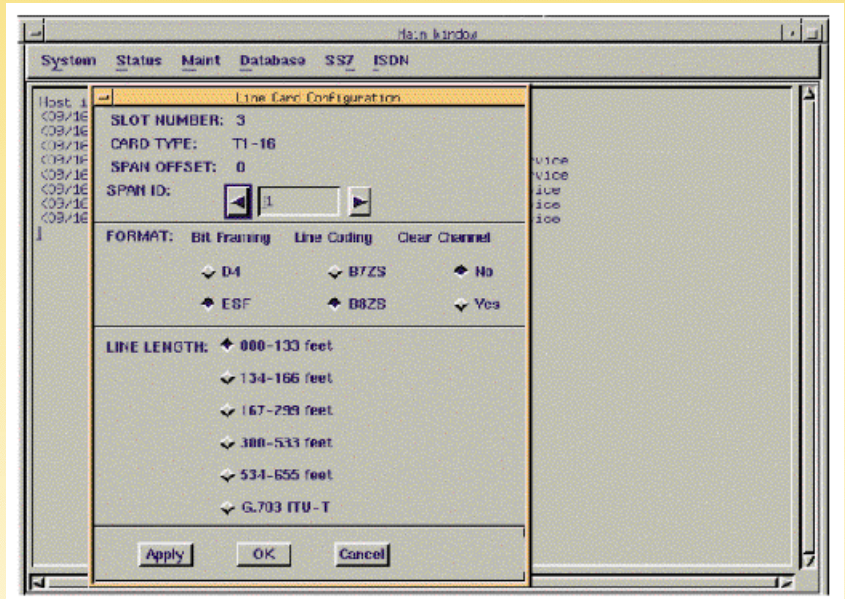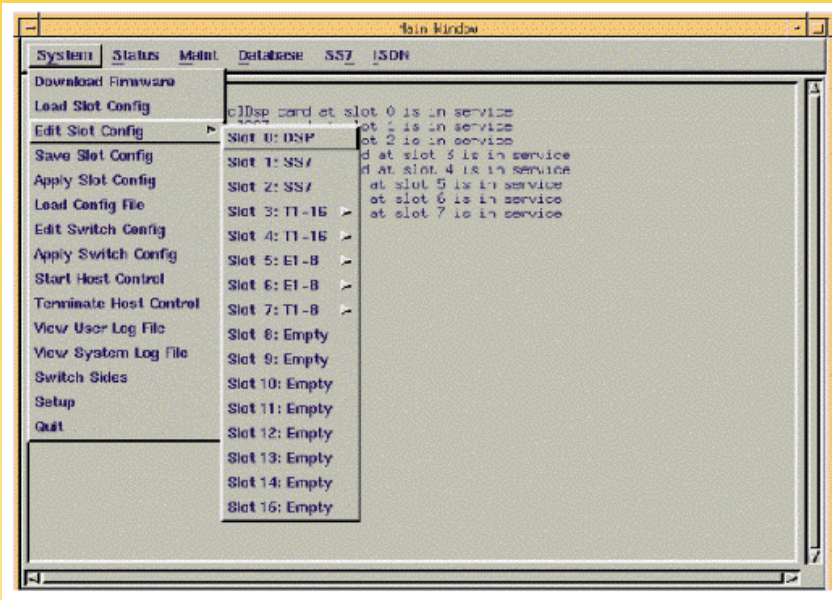
Reliability and Support You Can Count On

As a pioneering leader in open switching technology, Excel Switching Corporation places the highest priority on the quality and reliability of its switching platforms. In keeping with that philosophy, EXS ExchangePlus is a carrier-class solution designed to exceed reliability expectations in the market. All components feature optional redundancy architectures and are hot-swappable for critical in-service maintenance.

Reliability also is built into the EXS ExchangePlus software. For example, carriers can configure the routing tables in cascading order, thus permitting them to re-evaluate call-completion criteria if an attempt is unsuccessful. This maximizes revenue by ensuring the highest-possible number of completed calls. The full-featured

reporting system further ensures EXS ExchangePlus' reliability by reporting on inbound and outbound usage. For instance, abnormally low connection rates on a particular trunk group can alert the carrier to possible problems with incoming or outgoing networks.
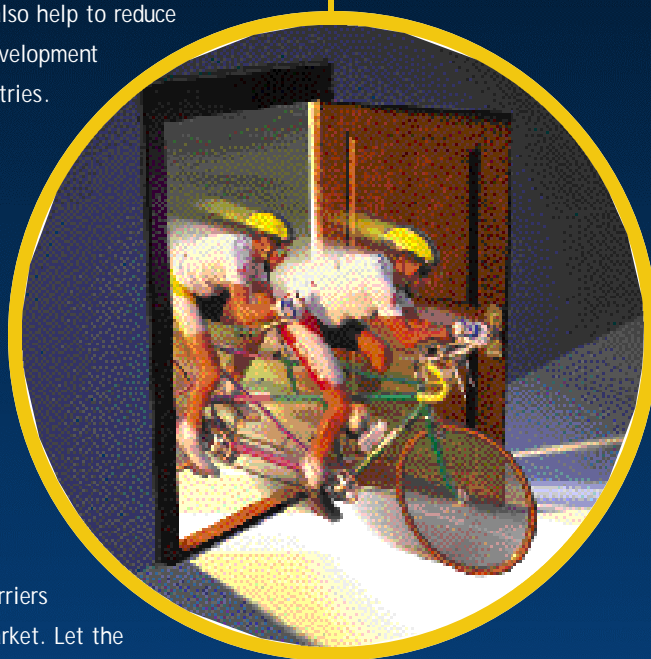
Excel also prides itself on high-quality service and support. With a number of flexible support plans, Excel offers its customers a full complement of services. In fact, one VP of Operations and Support Systems from a carrier that uses EXS ExchangePlus said, "Our experience is that most vendors provide 24X7 support by assigning an engineer to respond to pager calls. Excel provides true help desk support around the clock, an essential component of the support levels we need to maintain the service our customers demand."

7

Continuing to Lead the Way

Excel Switching understands that carriers are under pressure on multiple fronts in today's market. They must be able to get up and running quickly; they must position themselves to take advantage of the rapid growth occurring in international markets; and they must maintain low cost of ownership to maximize profits. The EXS ExchangePlus integrated tandem and international gateway is designed to address these issues in the following ways:

- Fast Time to Market—EXS ExchangePlus is available now and deployable within weeks. It supports VoIP for market entry with minimal regulatory restrictions and has patented signaling flexibility to assure that the system is deployed on schedule. It provides numerous service integration options for best-of-breed applications today.

- Reduced Start-up and Operational Costs—The scalability of EXS ExchangePlus prevents carriers from having to purchase or finance excess capacity up front, minimizing startup investments. The solution's dense, compact footprint reduces operational costs for power, cooling, structural reinforcements, and monthly facility charges. Its remote-maintenance capabilities, which can eliminate on-site personnel at each location, also help to reduce labor costs. The ability to create in-country variants easily, reduces development costs and the potential need to develop work-arounds for certain countries.

- Revenue Velocity—The solution's VoIP capabilities can significantly increase profit margins and enable carriers to be first to market with new voice/data applications such as text-to-speech and unified messaging. The ability to integrate customized enhanced services differentiates carriers in a competitive market, increasing the number of potential customers. High system reliability protects revenue streams and the ease-of-use and detailed reporting further assures resellers that their customers remain satisfied.

This unique architecture is designed to overcome the obstacles to market entry faced by both new and existing carriers. With EXS ExchangePlus, carriers can open the door of opportunity in a fast-growing and ever-evolving market. Let the EXS ExchangePlus tandem and international gateway solution take you where you want to go, today, tomorrow and well into the future.

EXCEL SWITCHING