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What to Look for and Why When Buying a Telecommunications Switch

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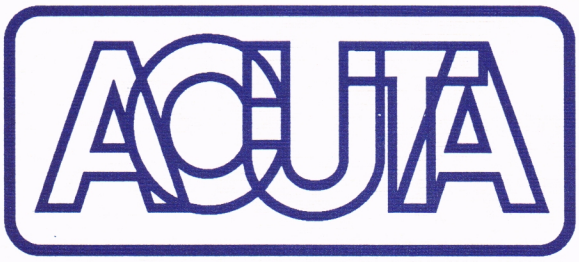

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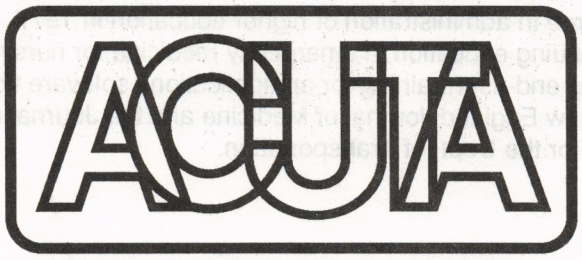

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What to Look for and Why When Buying a Telecommunications Switch

By Sara Knaggs

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There are three characteristics of institutions of higher education that have a strong impact on telecommunications:

- Campus Environment
- Multiple Service Populations
- Limited Budgets

Each characteristic translates into requirements for an effective telecommunications system.

To Serve the Campus Environment

A campus is usually the first image associated with the word "college" or "university." Typically, institutions of higher education are housed in several buildings which may be fairly close together, or spread over some distance, perhaps reaching across a city or even a state.

To serve the campus user, a system must provide feature transparency, regardless of location. Small groups of users at remote locations, such as agricultural buildings, or downtown arts centers, should have the same service level as users at the main campus. In addition, many colleges and universities have satellite or remote campuses, such as affiliated two-year institutions. Users at distant sites also should have transparent access to all the features available at the main location. If a multi-switch solution is required to achieve this level of service, then centralized administration should be a requirement. A one-switch solution typically offers administrative advantages in this scenario.

Look for a non-blocking switch that can serve the entire campus. Eliminating traffic engineering is a big plus with the highly mobile population of a campus. This is particularly true when voice and data service is provided. Also look for a switch with a distributed architecture. The ability to place cabinets close to clusters of users creates significant savings in cable installation and maintenance.

Multiple Service Populations

Support for Critical Applications

Colleges and universities are unique in their diversity. These institutions represent a multiplicity of users, all with differing communications needs. Some campus users such as hospitals, present particularly critical environments. A PBX must be highly reliable, and maintenance or support service must be immediately available 24 hours a day. Redundancy, with secondary or back-up processors, links, etc., in hot standby are essential.

Some switches include the ability to recognize customer-defined major problems, and automatically initiate a call to the service provider when such problems are self-detected. This reduces the requirement for round-the-clock, on-site support. The subsequent savings is achieved with little risk.

Another feature offered with some switches is automated alarm identification with support text shown on the system console on request. When alarms are displayed on the console, the technician can create a "window" that explains the alarm, the like causes and corrective actions. This productivity aid is a real plus where campus personnel rather than vendor personnel have the primary responsibility for day-to-day switch maintenance.

Accommodate a Wide Range of Requirements

Typical campus users include the faculty, students, administration and health center/ hospital. Some of these broad categories represent smaller populations with different requirements. For example:

> Academic usage might include learning labs, electronic submission of class work, instructional vide applications, desktop publishing, database inquires, connectivity to off-campus networks such as BITNET, ARPANET or INTERNET, in addition to standard voice feature utilization. Academic users might also use voice mail, electronic mail and message center applications.
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> Student, married and faculty housing might also be served by the campus communications system. In addition to standard voice service and voice mail, housing applications might include asynchronous data connectivity for library card catalog searches, electronic messaging, interactive voice response or dual-tone, multi-frequency (DTMF or "touch tone") database inquiries as to credits, fees, parking, events etc. Other housing applications might involve campus security such as a 911 system, a guard check-in system, or a door-lock system, all operating through the telephone system.
>
> Hospital or health center users might also need more than basic telephone service. These users might be interested in automatic call distribution, automated attendant, message center or physicians' referral service. Other unique health-care applications might include time of day control of incoming calls, hands-free answer for surgical suites, operating room scheduling, or a time-clock functionality.

Small, remote populations of off-campus users, such as agricultural buildings, urban art centers or sports arenas might have needs for basic voice and data communications. These users should have transparent access to all of the PBX features including call forwarding, centralized call answering, etc.

Research centers and other data-intensive users are likely to require high bandwidth and local area networking. Most data applications should be available through the switch, with dial-back security, and host-load balancing as options.

Other users can be identified, and for each, a specific set of appropriate features can be listed. The key is to choose a system with the flexibility to address the varied requirements of these many different types of users. An approach for flexibility is the use of standard interfaces open to third party developers (Open Applications Interface, OAI).

Limited Budgets

Cost Containment

No organization has unlimited budgets. All are focusing on ways to cut costs and increase productivity. To contain costs, one must first be able to determine how much is being spent, by whom and for what. A second approach to cost containment is to restrict access to expensive services, limiting usage to "authorized" personnel only. Resource sharing is a third alternative. Rather than purchasing individual units for each user, units which will stand idle much of the time, dial-up access is provided for users who then contend for service.

Cost Identification

The first approach, identifying actual expenses, can be achieved with telemanagment software packages that identify voice and data utilization by individual, by department, by authorization code, by project, by extension, etc. Once costs are identified, a system of charge backs can be implemented. Typically, once users become aware of their use (abuse) of the communications system, they become more conscious of the costs associated with each call, and modify their behavior accordingly. Also, a system of charge backs lets supervisors identify abuse of the system.

Implementing Selective Restrictions

Several options are available that permit the system administrator to permit or deny specific services to specific users, telephones or locations. Other options offer system-wide restrictions.

Least-cost routing lets the system determine the best facility for each off-campus call. Customer-defined route guides choose the the order in which trunks will be selected, and may even alert the user before the most expensive trunks are used. Queuing and call-back steps can be integrated in the route guides to enhance the cost savings possibilities with little impact on user acceptance.

A dormitory application that requires students to use authorization codes (auth code) for long distance calls might be considered, with the auth code activated only for their dormitory extension. An alternative application would define specific phones in public areas such as the student center building, the library, etc., to be auth-code activated. Then students could use their auth codes in their rooms or at the specified public phones but not at any other location on campus.

Resource Sharing

The concept of sharing expensive resources is inherent in PBX circuit-switched data. Modem pooling and fax pooling, for example, permit centralized devices to be accessed by any authorized user on a dial-up basis.

PBX-based local area network (LAN) connectivity also provides an opportunity for savings. Cabling for new users may be twisted pair rather than coax. More important, however, is the opportunity to provide inter-LAN connectivity (bridging of like LANs) through the switch. The elimination of leased data lines and high-speed modems generates a savings, while users experience no degradation of service. Indeed, for some configurations, a PBX-based LAN will increase cross-campus throughput.

ISDN (integrated digital services network) provides yet another cost containment feature with call-by-call service selection in which, for example, in and outbound WATS callers can share one trunk group.

Productivity Enhancement

The complement of cost containment is productivity enhancement. A communications vehicle should enable your campus to do more with less expenditure for administrative/support personnel.

Automated attendant and voice messaging may be used separately or together to decrease reliance on clerical support, decrease trunk holding times and associated costs, and to increase campus communications. Voice mail is a proven tool for reducing time lost to telephone tag, lost or inaccurate messages, etc.

In administrative and faculty office areas, message centers can be defined to provide personalized answering from centralized or distributed locations. Operators receive a screen of called party information from which they can properly respond to the caller. Once the message is taken, the system lights the message waiting lamp on the called party's phone. The user can then retrieve his or her message(s) from the phone display, from a local printer, or by calling the operator.

Students may save time and energy using an automated library search system, allowing them to scan the "card catalog" for reference material without leaving their dorm rooms.

Another productivity problem can be addressed with a telephone-based, time-clock application. This feature lets campus employees clock in/out from their desks, thus recovering the time lost walking to/from the time clock, or standing in line chatting while waiting to clock in/out. The system automatically precludes an employee from clocking in/out from the "wrong" phone.

Telemangement

Most of the productivity enhancement features address the end user. An automated telemanagement system brings productivity enhancements to the telecom department itself. There are two phases to automating telemanagement functions. The first phase is providing an integrated database for trouble-ticket generation, work-order management, cable tracking, inventory maintenance, etc. With this type of system, an entry in the user database (for call accounting purposed) or an entry into the cable management portion, is immediately reflected in all related files.

A second level of automation comes with the integration of the telemanagement system with the PBX, such that creating a station on one system automatically creates it on the other. Other applications might be batch moves/adds/changes (MACs), scheduled MACS, automatic assignment of available cable pairs, automatic inventory reduction with flags for reorder, and automatic work-order generation and clearing.

Interactive Voice Response (IVR)

Interactive voice response, typically in conjunction with an automated attendant function, offers two levels of productivity enhancement features. The first level, also achievable with a bulletin board function offered by several voice mail vendors, permits callers to use the DTMF pad of their phones to request general information. A digitized voice response is then played back to the caller. The second level of interactive voice

response permits access to a database, with the IVR product responding to DTMF input inquiries. This is similar to the account-balance inquiry service offered by many banks or investment firms. For some applications this database may be inherent in the IVR itself. Examples of such stand-alone applications might be: calendar of events, on-campus bus schedules, etc. More sophisticated applications may be integrated with a campus database, such as student registration, or permitting inquiries into financial aid files, transcripts or other types of records on the campus mainframe.

Use of interactive voice-response capabilities provides consistent phone answering over extended hours. The machine never takes a vacation, never calls in sick and never has a bad day. Employees are free to do more creative tasks, while callers get prompt, accurate replies every time.

Revenue Generation

Cost containment and productivity enhancement are only part of the story. Telecommunication can be a revenue generating activity. Options for developing income include tenant services and long distance resale, and outbound telemarketing. The tax implications of revenue generation must be considered before any of these options are implemented. In addition, each school must consider its philosophical position in regard to revenue generation and student services.

Any or all features of the switch can be made available to independent groups of users, with appropriate charges for service and usage. For example, a campus hospital might be surrounded by a medical park, and the university could supply telecom services to the doctors' offices in that complex. Similarly, research centers, housing units and other loosely affiliated entities could be served and billed for that service. With user group partitions, each entity appears to have its own PBX.

Colleges and universities are beginning to serve as the "phone company" providing telephone equipment and local as sell as long-distance service to student housing, married housing and faculty housing. Discounts can be offered to the users, making the service attractive, yet still providing income over expenses to the telecom department or university general account.

In addition to selling local and long distance service, schools may provide voice mail for a fee. Students will pay a monthly charge for a private voice mail box instead of purchasing an answering machine. Up to four students in a dorm room could have private mailboxes off the one directory number assigned for that room.

A recently-recognized method of generating income for the college or university, is to use an outbound telemarketing program to solicit alumni funds, or for collecting on student loans, etc. Several universities have reported significant increases in alumni donations with the implementation of predictive dialers and telemarketing techniques.

Security Features

In addition to the cost containment, productivity enhancement and revenue generating features, a PBX can be used for other services including several security applications.

Campus Security

Special PBX applications can be used to enhance campus security. A campus emergency 911 application can be implemented that will extract database information about the location and/or the user of each telephone and provides a screen of information about the calling party to the campus police or security department. Each dorm resident could be identified in the system, with related health information, for example. Then, calls to the police from that room would bring up a screen of information about the students in that room as well as information on how to reach that student quickly. For phones not associated with a specific caller, such as phones in parking lots, the screen might include location-specific information such as nearby environmental dangers. More sophisticated applications of campus emergency 911 might include a graphic representation of the campus with the originating location prominently displayed. Yet another application might correlate the location of the emergency call with a guard check-in feature, for quick identification of the closest possible responder.

Emergency Notification

Another campus security feature to consider is emergency notification, a feature which when invoked, initiates a call to a set of predefined numbers. The caller can then notify multiple destinations of a specific "emergency" situation such as school closing, a specific, temporary risk on campus, such as downed power lines, flooding, etc. The notification message may be a recorded message, or may be spoken by the person initiating the alert.

Data Security

A data security feature can be implemented to complement the asynchronous data capabilities of the switch. With data security, a user dials the desired host connection and inputs his access code. The system recognizes the caller, and initiates a disconnect. The system then makes an outcall to the authorized phone number associated with that access code. This prevents unauthorized access to sensitive databases.

Customized Applications

Some platform PBXs offer request status links (RSLs) that permit users to create custom applications. Several of the applications discussed in this article require this type of facility, sometimes known as an Open Applications Interface (OAI).

Other potential OAI applications might involve the use of the message waiting indication (LED illumination), the ability to write messages to users' display phones, the ability to transfer or reroute calls, etc.

Switch manufacturers who offer this kind of RSL-based customization should also offer documentation, tool kits and a tester for developers. The tester lets developers emulate the PBX operation so they can run their application without having a switch. The tool kits simplify applications programming.

The vendor should offer developers' classes and a hotline for developers to call when they have questions or problems in the development process. In addition, developers should have scheduled dial-up or on-site access to a lab at the manufacturer's plant.

Summary

Perhaps more than any other customer group, colleges and universities must focus on cost containment, productivity enhancement and revenue generation when considering the purchase of new communications equipment. These very real needs are compounded by range of communications requirements reflected in the diverse campus population. The successful product must be reliable, must make all features available to all authorized users and must offer the full range of voice and data features expected by users today. Furthermore, the selected switch should offer colleges and universities the option to develop custom applications based on their unique environments.

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