

Centrex Keeps on Going and Going

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Technology changes, as do popular trends, but Centrex keeps clicking along at a multibillion-dollar annual rate. The reasons people buy aren't likely to change anytime soon.

Long before "outsourcing" and "intelligent network services" became part of our industry's lexicon, Centrex offered aspects of both. A loyal installed base of large, multilocation customers depends on Centrex—some have subscribed since the early 1970s, when the service was first introduced.

Since the mid 1980s, the local exchange carriers (LECs) have also been offering Centrex to smaller businesses. Today, roughly 25 percent of Centrex lines serve sites with less than 100 lines, and this is the fastest-growing Centrex market segment (see Tables 1 and 2).

With 8.6 million lines in service and \$4.5 billion in 1993 service and equipment revenues, the Centrex market can't be dismissed as a backwater of U.S. telecommunications. The LECs know that Centrex is one of their core service offerings, that the best market opportunities are with smaller customers and that their large customers won't let Centrex die.

The service continues to appeal primarily to customers who, for a variety of reasons, don't want to buy or maintain their own telephone equipment (see "Why Centrex Still Makes Sense," p. 44). In most cases, these customers are unlikely to demand leading-edge applications, and that's good news, because the LEC sales reps are unlikely to offer them. Consequently, there is a wide gap between the feature/function potential of Centrex platforms and the services actually being used.

Centrex Technology Evolution

Centrex is supported on the central office switches built by AT&T (1ESS, 1AESS, 5ESS), Northern Telecom (DMS), GTE (GTD5), Siemens (EWSD), Ericsson

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(AXE) and others. Northern Telecom and AT&T Network Systems are the dominant Centrex vendors, and while this discussion concentrates on their actions, all the equipment vendors continue to evolve their flagship switching systems. This is done through a combination of hardware and software upgrades.

By year-end 1994, hardware upgrades will be available in the following categories:

- Sophisticated terminal equipment, including proprietary phones (P-phones) with backup emergency power and wireless phones.

- New line cards, such as those for ISDN basic and primary rate interfaces (BRI and PRI, respectively). The trend in line cards is toward "soft hardware," which is based on programmable gate array technology. Instead of having to carry 50 different types of interface cards in inventory, vendors will have a single two-wire card and a single four-wire card, plus 50 distinct types of software that can be downloaded into the cards.

- New switch fabrics to support ISDN $N \times 64$ -kbps switching and eventually asynchronous transfer mode (ATM).

- Store and forward messaging for E-mail, fax and voice.

- Remote switch modules that can be located on the customer premises and be interconnected by trunks back to a central switching system. These modules will enable more distributed call-management applications, such as network-distributed ACD applications and the "working together apart" practices discussed below. Many LECs are also bundling packet X.25 and frame relay data transmission services with distributed ACD services to link customer databases and service agents at multiple sites. (Also see *BCR*, March 1994, pp. 35–40.)

- Various data capabilities, such as frame relay, switched digital 56/64-kbps and T1 access. Primary-rate ISDN lines are increasingly being used to connect multiple remote Centrex locations, to provide wide-area Centrex and other functions. To take full advantage of ISDN, however, the LECs must modify their operations, administration, maintenance and computer support systems, as well as retrain their staff.

In the absence of either a strong marketing push or demand pull for ISDN, most LECs have confined their ISDN support to basic voice-oriented elements. ISDN's potential for data is rarely exploited, especially since the advent of newer services such as frame relay, SMDS and ATM.

On the other hand, ISDN's call management capabilities—for example, multiple line appearances, call-coverage groups and call distribution features—are more readily understood and adopted by Centrex customers. These features are used with CPE to improve call handling, customer service and user productivity.

Centrex customers have also shown a growing interest in CPE and service offerings that give them greater control over feature allocation and configuration changes. Terminals at the customer site are used to make software changes and to retrieve management information in offerings such as AT&T's Maxstar and Northern Telecom's Instant Change Order and Business Network Management. Bellcore has also developed Centrex Customer Rearrangement Service (CCRS) for its LEC clients to market to respective Centrex customers.

Centrex customers with newer key systems and PBXs can also handle system administration and management activities much more quickly than by placing service orders with the LECs. For example, Northern's Norstar key system has a Centrex software configuration option, and AT&T offers its Partner key system to interoperate with Centrex. Mitel has its Radicall Set Handler, a user-programmable interface product that allows its Superset 400 digital telephones to function with various Centrex switching platforms. This wide variety of CPE options speaks to the ongoing viability of the Centrex market.

Software Enhancements and a Modified Client/Server Model

The software aspects of Centrex enhancement are part of a larger set of issues driving the central office switch market, as illustrated in Figure 1 (p. 44).

At the bottom of the figure is a proliferation of hardware (for example, processors, phones, personal communicators) and software (for example, operating systems, database management systems, graphical user interfaces) of all descriptions. At the top are applications designed to meet users' expectations for ease of use, data access, application improvement and control. In the center is the burgeoning array of specialized servers that run programs, store data, establish connections, etc.

The challenge for switching system manufacturers is to facilitate connectivity among these layers. It would be prohibitively expensive and complex for manufacturers to supply specific interfaces (hardware and software) that could "glue" each resource or application to each of the individual servers. That reality is what drives the evolution of application program interfaces (APIs), programmable device drivers and other forms of generalizable middleware.

Both Northern Telecom and AT&T are strongly committed to significant restructuring and change in their core switching system software, generally based on the model shown in Figure 1 (p. 44). To this end, the switch makers expect to use a client/server framework and object-oriented software technology. The advent of megabit memory chips and processors with tens of millions of instructions per second has made this new approach both economical and practical.

Table 1
Year End Pacific Bell Centrex Installed Base by Customer Line Size

Line Segment	1990	1991	1992	1993	CAGR
2-19	44,147	93,379	142,436	192,677	63.4%
20-100	146,511	173,580	204,927	241,986	18.2%
100+	688,511	695,453	712,928	742,681	2.6%
Total	879,169	962,412	1,060,291	1,177,344	10.2%

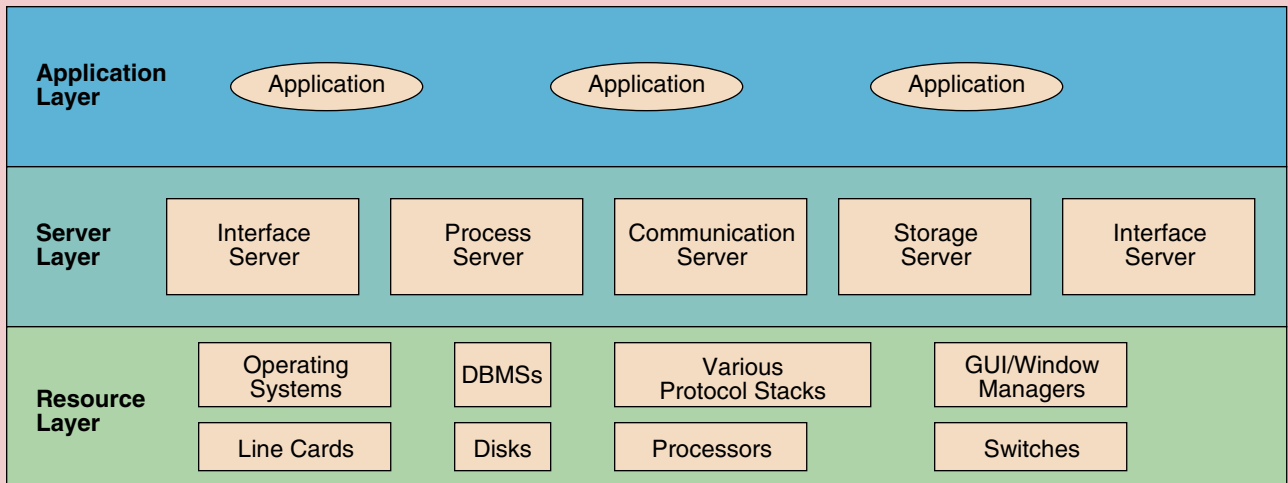
Source: Pacific Bell

Table 2
1993 Year End Bell Atlantic and BellSouth Centrex Installed Base by Customer Line Size

Line Segment	Total Lines in Each Segment		Fraction of Total Lines	
	Bell Atlantic	BellSouth	Bell Atlantic	BellSouth
2-40	318,813	288,265	15.8%	23.1%
41-100	128,650	171,889	6.4%	13.7%
101-400	242,012	241,839	12.0%	19.4%
401-1000	180,711	148,738	8.9%	11.9%
1001+	1,152,271	393,937	57.0%	31.6%

Source: Bell Atlantic, BellSouth

Figure 1
Client/Server Model for CO-Switch Development



Source: ESPI (Enhanced Service Providers, Inc.)

One of the desired results will be a sort of “next generation” Centrex. Client software for each user will determine his or her service profile, including features, access and control parameters. This software will interact with servers located on site and/or at the central office to deliver basic and enhanced services.

Centrex will migrate to the client/server model more readily than PBX-based systems

Each Centrex end user will employ electronic menus and forms to configure a unique user agent to access voice services (call coverage, call handling, convenience, CLASS and store-and-forward voice mail), data services (ISDN, frame relay, switched wideband services) and image services (fax, videotelephony). System administrators will also configure their user agents to use additional capabilities like network access options and dialing plans, call tracking, fraud prevention and network security, change orders and services such as network-based ACD and private virtual networking.

As resource-level hardware evolves, each of these user agents will have additional options. As new services and applications are deployed, each of these user agents will be able to choose among a larger menu of choices.

Client/server software technology is already embodied to a limited extent in the on-site Centrex switching nodes that are remotely managed from the provider’s central office or operations center. It’s ironic that Centrex

will migrate to the client/server model more readily than PBX-based systems. The CO switch vendors recognize that they must do this to support new hardware and software, while PBX vendors still see client/server costs exceeding potential revenues.

Centrex Marketing by the LECs

Perhaps a “next generation” Centrex, replete with flexible, easy-to-use customer software, will be sufficiently attractive to lure PBX customers away from their existing systems. Even before these client/server attributes are fully implemented, however, some Centrex marketers anticipate a renewed interest in Centrex from current PBX customers.

They point to the upcoming changes in the North American Numbering Plan (NANP), which will require costly reprogramming, and in some cases complete replacement of PBX systems that formerly assumed the second digit of all area codes would always be a zero or a one.

This longstanding practice is being eliminated to expand the pool of usable area codes and carrier identification codes (CICs). The first such area code (334) is scheduled for service in 1995 in parts of Alabama. Other changes will increase the number of digits used in international telephone numbers.

Once the full cost of adapting to these changes becomes apparent, some end users with fully depreciated PBXs may look to Centrex. If they like the idea of not having to reprogram their own systems for NANP and international dialing changes, perhaps they will follow the traditional path to Centrex—subscribe to the service you need and ignore the technology. Centrex sales have always been based on this key benefit, plus the added attraction of relatively low up-front costs.

Why Centrex Still Makes Sense

The traditional reasons that customers choose Centrex over PBXs are still valid and will continue to hold during the rest of the decade. These include:

- Centrex is scalable and requires only a modest up-front capital investment.
- Except for telephone sets, Centrex requires no premises equipment. However, new premises-based equipment is becoming available that can access Centrex services and manage configuration changes.
- Centrex customers pay only for the features they want and need.
- Centrex equipment and service upgrades are handled by the service provider, mitigating the burden of dealing with obsolete technology.
- Centrex bundles maintenance charges with its monthly service costs.
- Although some LECs market Centrex only with proprietary terminals, most support a wide choice of terminal equipment.

Government and academic institutions comprise roughly half of the installed Centrex customer base, but the base of commercial customers is also significant. Many Centrex customers have multiple metropolitan-area locations, demand very high reliability and responsiveness from their LEC and do not have (or want) an extensive internal support staff. Others prefer Centrex over premises-based systems because they are in a temporary location or uncertain about their future functional requirements.

As shown in Table A1, roughly 75 percent of all Centrex lines are used by customers with 100 or more Centrex lines. Note that Bell Atlantic and Ameritech each have roughly one-fourth of all Centrex lines.

The large customer market segment, measured by the number of Centrex lines, has been growing at roughly 5 percent annually since the mid 1980s. This growth is far from uniform: BellSouth, Southwestern Bell and

Ameritech have enjoyed relatively large increases in the number of lines serving large customers, while the remaining RBOCs have not experienced the same increase in growth (see Table A2). Centrex has been available to smaller businesses (under 100 lines) only since the mid 1980s, but that market segment now accounts for about 25 percent of all Centrex lines.

Selling Centrex, to large or small customers, has always been based on the function Centrex is required to perform. The whole point is for the customer to be able to ignore what the technology is and concentrate on what it can actually do to meet real needs. Nevertheless, Centrex is a complex service offering that requires extensive sales training in order to sell customers based on strong and detailed knowledge of Centrex service, coupled with a true concern for understanding customer needs□

Table A1
1993 RBOC Centrex Customers

	Number of Lines (in Thousands) with Customers > 100 Lines	Total Centrex Lines (in Thousands)
Ameritech	1,409	1,858
Bell Atlantic	1,575	2,023
Bell South	785	1,245
Nynex	726	931
Pacific Telesis	743	1,177
SW Bell	450	640
US West	554	705
Total (in Millions)	6.2M	8.5M

Source: Insight Research

Table A2
Number of Centrex Lines (in Thousands) Serving Locations over 100 Lines

	1986	1987	1988	1989	1990	1991	1992	1993
Ameritech	900	923	975	1,027	1,127	1,148	1,155	1,409
Bell Atlantic	1,225	1,279	1,323	1,402	1,434	1,476	1,492	1,575
BellSouth	404	458	553	609	696	764	748	785
Nynex	617	606	623	633	620	625	590	726
Pacific Telesis	794	765	742	765	689	695	713	743
S.W. Bell	210	205	216	267	300	345	427	450
US West	504	499	494	493	499	534	587	554
Total (in Millions)	4.6M	4.7M	4.9M	5.2M	5.4M	5.6M	5.7M	6.2M

Source: Insight Research

Table 3
Telephone Sets in Use behind Centrex

Set Type	Fraction
Key	66%
2500 Sets	62%
Proprietary	48%
Hybrid (Smart Key)	27%
ISDN Sets	22%
PBX	19%
Other	14%
PCs	7%

Note: Percentages total more than 100% due to multiple answers by some respondents and no answer by others

Source: 1993 Centrex Users Customer Survey, National Centrex Users Group

Some of the LECs have been more innovative than others. For example, BellSouth offers a money-back guarantee (in whole or in part, depending on each particular instance) within first 90 days after cutover to the new service. This may be a harbinger of a service guarantee (with money back under certain conditions) in the event of customer dissatisfaction.

Other carriers have bundled inside wire maintenance support, additional feature packages and voice mail—as well as a broader selection of terminal equipment—with their Centrex offerings. Centrex customers really want a variety of terminal sets, and they apparently do not want to be locked into a single vendor offering, as shown in Table 3.

Another new tactic is to pitch Centrex to the growing telecommuting market. With multilocation Centrex, workers at home or in separate metropolitan-area offices can “work together apart” using the same telephone services and features. In the next several years, the negative effects of long commutes and the positive benefits of cost-effective videoconferencing should combine to further boost this nascent market.

Other Channels—Agents and CAPs

In addition to their own targeted service offerings, the LECs have also implemented a successful distribution strategy through authorized sales agent programs. Under these programs, third-party systems integrators receive a commission from the LECs for the Centrex services they sell as a part of their own equipment and/or service inventory. All LECs are under cost pressures, and they have found that agents are a cost-effective, win-win approach.

Many sales agents also sell or lease Centrex CPE and offer additional services, including voice mail and long distance. Customers can also negotiate pricing, service and maintenance contracts with these agents to approximate the “one stop shopping” they used to get from the old Bell System.

Centrex Telemanagement (San Francisco) is the largest Centrex value added reseller in the U.S. and one

of the pioneers in this emerging market. Centrex provides telecommunications management expertise and day-to-day service and support, and it offers services including Centrex, store-and-forward messaging and long distance. Its target market is small to medium-sized businesses with “champagne appetites and beer budgets.”

The bulk of Centrex’s business is in California, with recent expansion in Illinois, Michigan, New York City, Connecticut, Boston, New Jersey, Pennsylvania and Maryland. Over the past 10 years, the company has grown to nearly \$200 million in annual revenues. Competitive access provider Metropolitan Fiber Systems (MFS—Oak Brook, IL) recently announced a takeover bid for Centrex.

MFS has also announced its intention to compete directly with the LECs for local service markets, and we can speculate that Centrex would afford MFS a market presence, a customer base and a proven management team. Other companies may also bid for Centrex, since the MFS takeover remains in doubt as of early May. If it is successful, however, MFS would (at least initially) be in the odd position of reselling one of its competitor’s services: Centrex!

Other competitive access providers (CAPs) are also potential Centrex providers. Teleport Communications Group (TCG—New York City) already provides a redundant backup to LEC Centrex, private line and other services, and it is planning to offer Centrex service from its own central office switching equipment.

TCG and MFS are the two largest CAPs; each has operations in over a dozen major U.S. cities, and each continues to expand. Centrex could become a key value-added service for them and for other CAPs, as they compete directly with LECs for business customers. In addition, the CAPs could potentially offer customers a choice among multiple long distance carriers, as well as multi-location, wide area Centrex-type service.

Finally, we note in passing that interest in Centrex is growing outside the U.S. In the U.K., in particular, deregulation has led both traditional and new carriers to look to Centrex as a means of providing customers a cost-effective, functionally rich service offering.

Conclusion

The manufacturers have major overhauls on the drawing boards for the CO switches that serve as Centrex platforms. These makeovers could catapult Centrex hardware and software capabilities into the world of client/server and object-oriented technology, depending, of course, on the pace at which the LECs deploy the new switches.

In general, the trends that have kept Centrex healthy for the past five years will continue over the next several years. Recognizing that Centrex is their core business offering, the LECs will continue to serve existing large customers and to fine-tune their approach to the lower end of the market. Centrex is a strategic business service for every RBOC, and it may become one for the competitive access providers as well.