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## Computing in Transition

The day of the large general-purpose, single facility computer center may be ending for many educational and research institutions. The centralized operation that tried to be all things to its broad spectrum of users within the institution is giving way to extrainstitutional approaches to providing and receiving information and computing services.

Born and reared in the middle of the Eisenhower years with a big boost from government seed money and the promotional discounts of computer manufacturers, the computer center enjoyed a dozen years of steady growth and expansion. But early in the Nixon years, a sharp drop-off in external support and funded usage compounded by some customers relations and credibility problems arrested its development. As deficits began to appear like warts on soaring computer budgets, institutional executives started searching for alternatives to the computer center.

Alternatives to the center do exist. Minicomputers, commercial time-sharing services, government subsidized facilities, and regional networks offer users other means of getting their work done. Indeed, the fact that users were already availing themselves of these options was partly responsible for the decline in revenue experienced at the computer center.

Some institutions relaxed restrictions on users' purchasing outside services or acquiring their own minicomputers. Some institutions formed or joined regional networks with government support or got together in other ways to share computing resources. Two of the approaches taken to solving the deficit problem are of special interest.

The first, call it "retailing" services, is exemplified by Harvard's approach. Harvard effectively shut down its main computer center and returned the large computer to the manufacturer. Simultaneously, it established an office to develop the substantive use of outside services in addition to on-campus resources.

The second and complementary approach, call it "wholesaling" services, is exemplified by the centers at two campuses of the University of California: Los Angeles and San Diego. These centers have made their services generally available over the national computer network known as ARPANET at a charge to such customers as the RAND Corporation and the University of Illinois. The additional revenues gained by this means have made cutting back and returning computers at these campuses unnecessary.

What all this may be leading to is the development of a national marketplace for computing and information services. Users at one institution will be able to obtain a wide variety of services from other distant institutions as though they were being supplied by a local center. The division of labor, specialization, and refinement of services made possible and encouraged by such a development could mean a major advance in the quality and variety of services available. But there are interesting and important questions on the role of the government, participation of profit-making companies, and working relationships among users and the institutions involved. These questions need to be carefully formulated and explored.

The essential first step is formation of a council of officers of interested institutions. This was the chief recommendation coming out of a series of seminars called by EDUCOM earlier this year to discuss the subject. Plans to organize the council are currently being discussed by EDUCOM with the American Council on Education, the Association of American Universities, and a number of colleges and universities. —MARTIN GREENBERGER, *Department of Mathematical Sciences and Center for Metropolitan Planning and Research, The Johns Hopkins University, Baltimore, Maryland*

# Science

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Martin Greenberger

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