Is There a Picture in Our Networked Information Future?

by Richard P. West

CNI's purpose is to explore ways to use networked technology to deliver information. The information technology that supports networked information continues to evolve at an amazing rate. Not so very long ago, basic text was the extent of the information that could be transferred across data networks. Symbols and images could not be integrated into the text, due to technical limitations of the equipment available. Now, we talk not only of images, but of multimedia—the integration of audio and video as well as images and text. We have come a long way!

To me, the significance of these multimedia and image-based technologies is that these capabilities are now good enough to replace information that has been produced in printed form. By good enough, I mean that networked information technologies can store, distribute, display, and print information in ways that are directly substitutable for their printed counterparts. In some ways, because of the speed of transmission and the ease of storage, the electronic versions are actually better.

At CNI’s Spring 1995 Task Force meeting, much of the program focused on the six projects that make up the NASA/NSF/ARPA-sponsored digital-library program. Representatives from all six projects were present at the meeting and shared their ambitious plans and strategies with CNI Task Force members. The projects were awarded in October 1994, and are now moving into their development phase.

Several of these projects plan to create databases of images such as photos, maps, and videos. These are unique resources, now housed in relatively inaccessible collections. The general area of developing image-capable searching, storage, distribution, and printing capabilities on a production, multi-user basis is part of the challenge as these projects implement their prototype system.

Although the federally funded digital-library projects are invaluable efforts, one of the sessions most instructive to me at the meeting was a breakout session regarding the TULIP project. TULIP was spawned at the Spring 1991 CNI Task Force meeting by a publisher’s challenge to higher education members of CNI. The challenge was to cooperatively produce a series of networked journals to show that such things were possible as a real alternative to print versions. As a result of that challenge, Elsevier Science and nine universities started work on a joint initiative. The project focused on forty-three material science scholarly journals, and the project plan called for an image to be made of each printed page of each of these journals. The partners agreed to deploy the image database at each of their institutions with local searching capabilities familiar to their respective campus environments.

TULIP was developed as a technological and economic experiment. It is a technological experiment because it pushes, in a production and robust networked environment, a large set of electronic information. How do users interact with these networked information resources as compared to the print counterparts? It is an economic experiment to determine usage and suggest alternative purchase arrangements for scholarly information rather than the traditional subscriptions for printed journals. At least one institution, the University of California, installed the TULIP database in one location for use by the nine-campus UC system, using UC’s inter-campus network. This implementation of TULIP is particularly interesting because it most closely replicates a national network environment regarding network capacity, varied technological platforms, and a significant number of remote users.

For CAUSE members, I believe the experiences and findings of the TULIP project to date are particularly important. In college and university administration, I have seen a number of applications using image technology that are being sold for specific solutions. Systems that manage specific types of records—admissions, registration, official correspondence, and general documentation—frequently use just a few of the image-based technologies available in the marketplace. Image-processing technology is at a key evolutionary stage, and I believe it is very
easy to invest too much, too soon in these technologies. Earlier technologies such as Sony Betamax videotapes and Wang word processing systems recall good, solid technologies that did not survive in the marketplace. In other cases, many colleges and universities still are dealing with “islands of technology,” due to incompatible technological architectures that restrict interoperability.

The TULIP project, as well as other digital library projects, demonstrate important lessons regarding image processing. Network performance is probably the most significant finding. Image systems require significant network capacity at this stage of development of image technology. Each image is a much more significant amount of information than text, and places significant demands on network resources.

Equally important is a finding that is obvious in retrospect. In key areas of image processing there are no standards, which are needed if broad interoperability is to be achieved. What compression standards should we use to create and store images? What are the minimal display platforms needed to adequately handle satisfactory display of images? What resolution is minimally acceptable for display of images? And, of course, there is the already mentioned issue of network capacity. These are all the obvious questions regarding standards. You may already be developing such standards for image processing on your campus. Nevertheless, the experience from the TULIP project suggests that there remain many surprises when you begin full-scale implementation of an organization-wide image-processing system.

Right now, I imagine that there are a number of image systems cropping up in various user areas of your campus. The registrar has one, the physical plant people are looking at one, and the library is part of a joint image project with another institution. Have we done our infrastructure homework on this next important wave of technological evolution? Or are we just willing to accept the next stand-alone image-processing application that may be tomorrow’s Sony Betamax videotape? Which of these various image projects can garner the political and financial support to enable the others? Initiating a thoughtful analytical work on the current state of development of standards for image-processing systems and the experience of specific projects across all areas of your campus would serve every technology manager and his or her institution well right now. In fact, the sooner such an effort is updated or initiated the better!

NOTE:
More information about the TULIP project can be found at http://www.elsevier.nl/ The TULIP page at this location also contains a demo of the TULIP Web system at the University of Michigan (found under “universities”).