# AT&T INNOVATION BRIEFS

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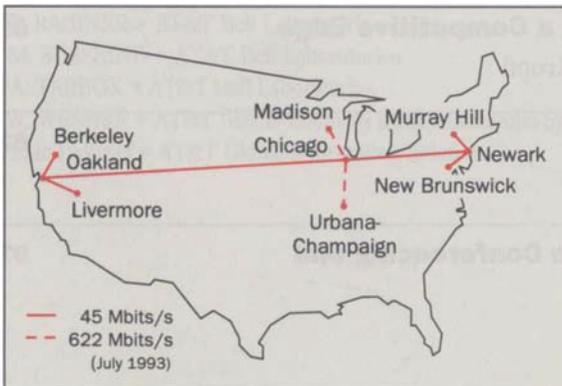
Light Emitted from a Molecule

Spatial images of light seen from two neighboring molecules.
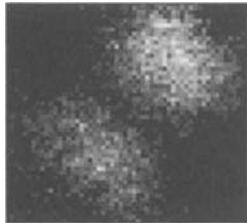
For the first time, researchers have observed the fluorescence spectrum of — or light emitted from — a single molecule, and have separated it into its various wavelength components. The observation was achieved at AT&T Bell Laboratories using near-field optical microscopy, a technique that relies on passing light through a tiny aperture — much smaller than the wavelength of light — mounted at the tip of a strand of optical fiber. Light from the aperture is positioned very close to the molecule under examination. The result is far better spatial resolution than can be achieved using conventional optical microscopes, which are limited to about one wavelength. Observation of the fluorescence spectrum of a single molecule has been a long-standing goal; the spectrum can uniquely identify the molecule, as well as give information about both its local environment and its motion. Due to its unprecedented spatial resolution and sensitivity, this new technique will find applications ranging from characterizing submicron lithographic features to examining living cells.

Architectures for Switch-Control Software

Berkeley
Oakland
Livermore
Madison
Chicago
Urbana-Champaign
Murray Hill
Newark
New Brunswick

— 45 Mbits/s
-- 622 Mbits/s
(July 1993)

XUNET — Experimental University Network

A virtual circuit is a prearranged route used for communication between devices or host computers attached to a data network. Switch-control software sets up virtual circuits and makes it possible for messages to flow through them. To study the architecture of switch controllers, AT&T Bell Laboratories researchers have built a sequence of prototype switch controllers. The goal is to easily offer new services and accommodate new switch hardware. The latest prototype is used on the Xunet-2 testbed. Under way since 1986, the Xunet program is a collaboration between AT&T Bell Laboratories and leading universities and national laborato-

ries. In this prototype, call status is shared by threads that implement channel allocation, signaling, routing, and queue control. Separation of concerns makes the software easier to understand, maintain, and modify. This has enabled research into alternate signaling mechanisms and different ways of providing quality-of-service guarantees per virtual circuit for network users.

Patent To Build On

Signal-Sequence Editing Method and Apparatus with Automatic Time-Fitting of Edited Segments

In a particular realization of this invention, a telephone voice-messaging system has been constructed. The messages can be edited and the playback rate controlled by either the sender or the recipient, using the menu options on a terminal. In this system, voice is digitally encoded, stored in fixed-size blocks, and the energy in each block is used to determine if the block is active or silent. Editing is performed by first placing pointers at silent blocks, displaying the positions of the pointers on a time-line display, and then either inserting additional voice at a pointer, deleting voice between two pointers, or moving the voice between two pointers to a third location. Constraining the pointers to silent blocks makes it easier to edit words and phrases. The playback rate is controlled by changing the duration of silent intervals. The voice editor has been extended to edit combinations of voice and text with the same instructions. This system was first constructed in 1980, and a videotaped demonstration is available. Such a sound-oriented editing capability has potential applications in equipment used for dictation, for magnetic sound recording, and for sound motion pictures. Inventor: N. F. Maxemchuk. (US Patent No. 4,375,083)