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Computer Column

Networking computers for data collection and analysis is becoming increasingly feasible for the TL laboratory. The following is one such example.

Ed Haskell

Computer networking for a TL dating research laboratory

G.A. Ennis*, S.L. Forman[§] and V.J. Bortolot[†]

With the ever-increasing volume of data collected by TL laboratories, data management is becoming plagued by two problems: (1) reliable, convenient storage of data and (2) overcoming difficulties with remote data analysis. Previously, both data management problems were dealt with through a time-consuming backup and/or transfer of data on floppy disks. We have established a comprehensive data management system for a TL laboratory by networking together all data collection, management and analysis functions. (Fig.1) The result is a flexible environment for fast, convenient data management with the capability of remote data analysis, storage, backup and printing.

Network capability was achieved by connecting four personal computers together using a Tiara (Mountain View, CA) Arcnet topology (2.5 MB/sec data transfer rate), coaxial cable, and a passive network hub. A single IBM-compatible 2 MB 12 Mhz 286 AT-type personal computer (PC) with two 40 MB hard drives functions as a non-dedicated fileserver and the primary data analysis workstation. Three 8088-based IBM-compatible PC's, with 640 KB ram, 8087 math coprocessors, and 40 MB hard drives, perform as data collection and secondary analysis stations. These computers were previously fully dedicated during data collection. New software (Fresh Technology, Gilbert AZ) allows access to the individual hard drives even during data collection runs. Network peripherals are connected to the file server and include an Everex (Fremont CA) Excel Stream-60T cassette tape drive (60 MB per tape) for backup and archiving of data and a Panasonic KX-P4450 laser printer for text and graphic output. Each data collection station is also attached to an inexpensive local printer. An uninterruptible power supply (UPS) is recommended for the file server to protect it from power disruptions.

Data collection is accomplished through the use of one Daybreak Nuclear and Medical Systems model 1100 automated TL system and two Daybreak modular TL systems attached to PC's. The automated system uses a serial interface in contrast to the modular unit which has a parallel interface. This allows one PC to handle both the automated system output and the output of one modular Daybreak system (although not at the same time). Consequently, all data collection is performed with just two PC stations, freeing one 640 KB "spare" station and the non-dedicated file server for data analysis and management functions. We run our data collection software from the local hard drive of each station, rather than over the network, to avoid potential degradation in performance that could arise from a network slowdown

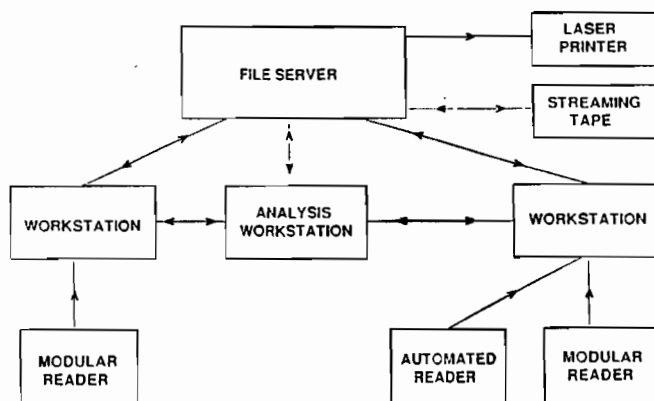


Figure 1. Network Schematic

during transfers of very large files. Novell (Provo, Utah) ELS Netware 286 Level I is used to support up to four nodes (three stations plus file server) allowing workstations access to server directories. Fresh Technology's "Map Assist" allows the server direct access to data on the workstation hard drives. When these are used in conjunction with the Daybreak TLAPPLIC program, workstation and server files can be entered even while data collection is in progress (with the exception of the active file). Access to file management, word processing and other software is also maintained. Other versions of Netware support additional nodes, although most require a dedicated file server and version 2.12 will reportedly not recognize a math coprocessor in a non-dedicated file server (N. Laux, personal communication, 1990). A variety of other network architectures (Ethernet, etc.) and hardware configurations are also available. In any event, we recommend consultation with, and installation by, a qualified network dealer. After installation, laboratory personnel should be able to handle ongoing network management which consists primarily of keeping a clear record of data transfers and occasional changes to custom menus and security clearances.

The networking of data collection, analysis and storage has facilitated intensive research strategies allowing visiting and resident scientists and students to concentrate on more thorough study of the limitations and promises of TL dating. We are willing to discuss the further development of network capability and offer assistance in establishing similar networks in other laboratories.

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* Institute of Arctic and Alpine Research, Univ. of Colorado, Boulder, CO 80309-0450

§ Byrd Polar Research Center, Ohio State Univ., Columbus, OH 43210

† Daybreak Nuclear and Medical Systems 50 Denison Drive, Guilford, CT 06437