

Networking and Engineering Overview

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Network Activities

It is indeed an interesting time to be involved in data communications and networking. Our most exciting activity centers around the new network design, still cleverly designated as MFEnet II. To meet the goals of this major effort in a reasonable time frame, we have minimized or frozen development on the current network. When essential development efforts on the current network have been necessary, we have contracted them out as much as possible.

Freezing development certainly requires the consideration, understanding, and patience of the network user community—and we have been fortunate in the support we've received. Several sites have offered much appreciated help. Lawrence Berkeley Laboratory and the University of Texas at Austin have "loaned" us the part-time services of Wayne Graves and Alan McMahan. Argonne National Laboratory completed and brought up a new BITnet gateway, which we now use for BITnet mail. Meanwhile, the San Diego Supercomputer Center (SDSC) is busily improving their implementation of MFEnet, although they call it SDSCnet (another imaginative name). We may be able to take advantage of some of their enhancements in the near term to breathe a little more life into the current network.

Even with a freeze in place and additional help, winding down efforts already under way or committed has required a great deal of work. Tim Voss's engineering group has been continuing to install new user sites on the current network. Barry Howard's band of hearty programmers have been busy with conversion to the VAX 8600, bringing up the VAX tape station, making fixes to our network software, and fine tuning some of the CRAY software. Paul Lund's group has been working on the Japanese link, some minor changes in network software, and experimenting with rewriting some of the network software in "C." (All three have written detailed reports about their groups; those articles immediately follow this one.)

MFEnet II Progress

Our major activities on MFEnet II this past year have been directed at the hardware procurement and at the detailed design. We conducted a competitive procurement for hardware (and some software) to be used in the new network. This required a technical specification to be developed, several vendor visits, and a formal evaluation. We have selected Digital Equipment Corporation (DEC) to supply micro-VAX IIs as the basic compute engine for the effort and a real time software "operating system" called VAXeln. We hope that by the time you read this we will have signed the contract with DEC and will have taken delivery of an initial configuration of equipment. We have been working intently on the design and are nearing completion. We decided to do a great deal of up-front design before committing to any software, and we have managed to encounter many problems and solve them while they are still on paper. We have detailed the design decisions in semiformal Functional Specification documents and hold weekly meetings to review them. I am also working on an overview document, an External Reference Manual, with a considerable amount of technical writing help from Gene Ledbetter.

Intra-Agency Networking—ESnet

In last year's annual review article, I noted the growing interest in generalizing the usage of MFEnet II. That concept has been formalized and expanded with the approval of an Energy Sciences Network (ESnet). In an October memo, Alvin Trivelpiece stated that the Office of Energy Research "Scientific Computing Staff should move forward to implement the Energy Sciences Network." Currently the ESnet is a name applied to the collection of networking activities going on under the various offices in Energy Research. The MFEnet II and HEPnet networks seem to be the two most prominent efforts. The plan calls for a migration toward using the MFEnet II as a common carrier or "backbone" for most long-haul data communications within that community. A steering committee has been established to develop a plan for migration to that goal. Eventually then, ESnet and MFEnet II will become synonymous.

Inter-Agency Networking

Last year's article also discussed work under way at an interagency level to explore the possibility of developing a super network of existing agency networks. In early 1986, a meeting of representatives from interested agencies took place. Those agencies included the National Science Foundation, NASA, and the Department of Energy. I presented our network plans, and we received many favorable remarks. It was noted that our new design would greatly facilitate the interagency effort. Since that time, a fairly extensive report suggesting a possible implementation plan for such an interagency effort has been produced. A second report on some of the issues that must be addressed if the interagency network is to be successful has also been drafted and will be submitted as part of a very large, congressionally-mandated study on networking activities. Although this effort may seem to be moving slowly, I am encouraged by the continued level of interest.

International Networking

In the spirit of the ESnet concept, we have been exploring the possibility of satellite links to several sites in West Germany and Japan, and a link to CERN in Switzerland for shared use by different programs. Since the CERN link seems to be most urgent, we have been funded to install a satellite-based link between FERMI Lab and the CERN facility this year. Initially, this link will be used by the High Energy Physics program, but after a three-phase migration plan, it will eventually (in 12-18 months) become "just" another link in MFEnet II.

Interplanetary Networking

To date we have not received any responses from beings on other planets, but interest remains high.