Research in Progress

The Computer Science Network

Lawrence H. Landweber

Computer Sciences Department
University of Wisconsin, Madison

THE CSNET PROJECT, sponsored by the National Science Foundaton, has as its goal the design and implementation of a computer communications network to provide services to computer science research groups in the United States Experience with Arpanet has shown that access to a computer network can lead to a significantly higher level of interaction between geographically dispersed researchers. This can result in an increase in the quantity and quality of research produced by these researchers. In addition, it is expected that availability of a network will help address the current 'crisis in computer science' by encouraging more researchers to remain at universities. In this regard, a goal of CSNET is to foster 'universal connectivity', i.e., participation by every university, industrial, and government computer science research group in the United States. By December 1982, over eighty university, government, and industrial sites will be participating.

CSNET is a logical network with hosts connected to a number of physical networks including Phonenet, Telenet and Arpanet. Adoption of compatible protocols enables communication between users of hosts on the different physical networks. Cooperation with the Department of Defense, particularly DARPA and DCA, has been instrumental in enabling communication between CSNET hosts on the component networks.

Supported network services include electronic mail, file transfer, and remote system access. A variety of access alternatives at different costs and service levels are available Fees depend upon usage levels. The system has been structured so that any computer science researcher in the United States can can afford to participate if only via access to the network mail system. Design and implementation of CSNET is underway at the University of Wisconsin, Rand Corporation, Purdue University, and the University of Delaware In addition, BBN has recently received a contract to operate the CSNET Coordination and Information Center.

As of August 1, 1982 twenty seven sites were participating in the Phonenet component of CSNET. A mail relay computer at the University of Delaware delivers mail to and picks up mail from each Phonenet host several times a day Phonenet hosts can send mail to or receive mail from Phonenet and Arpanet hosts. By October, a second relay, at Rand, will be operational. As traffic warrants, more relays can be added. The Rand and Delaware relays are connected to Arpanet and Telenet Each relay will poll a selected set of Phonenet sites. However, users need not know either which relay polls their site or which relay polls the recipient site. Phonenet provides mail access to the CSNET and Darpa Internet environments. Phonenet addresses conform to standards used in Arpanet and hence need not specify route information. Moreover, either delivery or notification of nondelivery is guaranteed (as much as is possible).

Phonenet is only one component of CSNET The Purdue project will enable CSNET hosts to connect to Telenet via

the X.25 protocol. Above X 25, the DOD TCP/IP protocols are being used so that CSNET Telenet protocols are compatible with Arpanet protocols. Purdue is interfacing an X.25 implementation from Interactive Systems to a TCP/IP implementation from BBN and tuning the various components to Telenet requirements. The system is in beta test with installations at Purdue and Wisconsin now communicating via Telenet. Distribution is planned for early 1983. Telenet direct connections can be at speeds up to 9600 bps. Hosts employing such connections will be provided with network mail, file transfer, and remote system access protocols for use amongst Telenet CSNET hosts. In addition, mail communication between Telenet CSNET hosts and Arpanet/Phonenet CSNET hosts will be possible. Telenet connections will be suitable for groups requiring file transfer or remote system access capability and those desiring real-time network mail service.

Hence, CSNET hosts will be connected to Phonenet, Telenet or Arpanet. To simplify the location of people and resources in the environment, Wisconsin is designing and implementing a CSNET Name Server facility. This system involves a central directory database of users on a Service Host machine (currently at Wisconsin) plus software installed on CSNET hosts. Users will be able to specify keywords instead of full network addresses (which can get complicated in an internet environment) to describe mail recipients, i e., they will not be required to know any information on the recipient other than enough keywords to produce a unique match with a directory database entry. Individual users will install and maintain their own database directory entries. Address information resulting from successful matches will be locally cached and required redirection of mail, when recipients change their mailbox address, will be automatic. The first phase of the name server software is in beta test (lookup of addresses from keywords, registration of users). Phase 2 (local caching, keyword addressing) is scheduled for November and phase 3 (automatic forwarding) is scheduled for February 1983.

To provide for management of CSNET and continuing network development, a CSNET Coordination and Information Center (CIC) has been established at Bolt Beranek and Newman. The CIC is now responsible for interacting with (potential) users and for providing network information functions. It will eventually be responsible for network maintenance and management.

The CSNET NSF contract supports development of software for DEC VAX/Berkeley UNIX and PDP 11/V7 UNIX systems. A number of sites are in the process of converting the Phonenet software to run on non-UNIX systems. In addition, IBM is sponsoring a project at Wisconsin to design and implement required protocols for CSNET Telenet connection by IBM VM/370 systems. We expect that there will be similar joint projects involving other vendors and schools.

At the present time the project is managed by the NSF Computer Science Section with support from several advisory groups (Management, Policy, Organization, Techni-
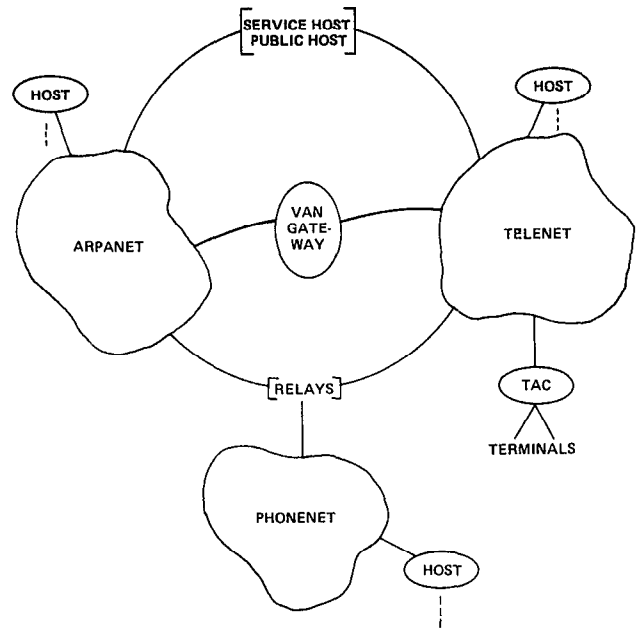

Figure 1   CSNET Architecture

cal). Approximately 50 individuals, broadly representative of the computer science community have participated in activities of the support groups. A governing group or consortium, called CSNET Inc for lack of a better name, is soon to be formed. Organizations participating in CSNET will be members of CSNET Inc There is a dues structure and users will be responsible for communications charges they generate.

Applications for CSNET participation (currently Phonenet) should be sent to the CIC at the address below. As of August 1 there were 27 CSNET Phonenet sites and 17 CSNET Arpanet sites. Applications are welcome from any university, industry or government group that is engaged in computer science research.

For further information on any matter relating to CSNET or for application forms write to: CSNET Coordination and Information Center, Bolt Beranek and Newman, 10 Moulton St , Cambridge, MA, or call the CSNET hotline at (617) 497-2777. Technical reports and descriptive information are available from the CIC or via Arpanet (Host: csnet-sh, User: anonymous, Password: guest, UNIX Directories: /csnet/docs and /csnet/dn).