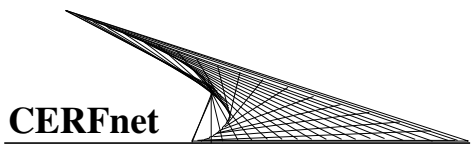


California Education and Research Federation Network
c/o San Diego Supercomputer Center
P. O. Box 85608
San Diego, California 92138-5608
(619) 534-5087

California Education and Research Federation Network Summer Research Fellowship

Description

CERFnet is an NSF-sponsored regional network linking colleges, universities and industries in California to the nationwide NSFnet. Up to two $5,000 fellowships will be awarded for the development of tools and techniques to further this goal. Proposals are particularly encouraged in the following areas:

- ❒ Tools for network configuration and management.
- ❒ Models of network traffic for prediction of bottlenecks and forecasting resource needs.
- ❒ Tools and techniques for detection and tracing of network security violations.
- ❒ Dynamic addressing and routing techniques for restricting access of particular network nodes.
- ❒ NSFnet compatible protocols and techniques for very low cost connection of nodes.
- ❒ Introduction of network services to K-12 schools and instructors.

As part of the fellowship, participants must submit an article to the *CERFnet News* describing their work and its availability and submit a technical report to an approprate academic journal or conference.

Eligibility

Fellows must be full-time graduate students during the spring term of 1990 at a CERFnet member university or college. Fellows are expected to devote their effort full-time to their project during summer 1990. Payment of the fellowships will be in three installments: $2,000 on June 1, 1990, $2,000 on July 2, 1990, and $1,000 when the article for *CERFnet News* is complete and the work has been submitted to a conference or journal for publication.

Selection

A selection committee will review the application materials and make awards. The selection committee will not make awards if it determines that there are no qualified candidates. The selection committee will be made up of representatives from CERFnet member institutions.

Application

The following application materials are required.

- ❒ A completed CERFnet Fellowship Information Form.
- ❒ A recommendation from the supervising professor at the applicant's school. The recommendation must include a commitment to supervise the proposed research, and discuss the applicant's ability to conduct the research.
- ❒ A vita of the applicant including related coursework and grades earned, and previous research projects.
- ❒ A narrative describing the research problem, approaches to its solution, and specific tools or techniques that should result from this research. *The narrative must be no longer than four pages.*

Deadline

Application materials must reach the selection committee by February 9, 1990. Successful applicants will be notified by April 2, 1990. Application materials must be delivered to:

Dr. Brent Auernheimer
CERFnet Fellowship Committee
Department of Computer Science
California State University
Fresno, CA 93740-0109
(209)294-4373
brent@CSUFresno.edu

Internet Engineering Task Force (IETF)

Chairperson: Phill Gross

The Internet Engineering Task Force (IETF), a subsidiary of the Internet Activities Board, deals primarily with engineering the TCP/IP Internet, improving its performance, and analyzing problems that arise as a consequence of the Internet's rapid growth. This task force is charged with addressing nearer term Internet problems and protocol evolution such as the coordination of the development of an internet network management framework, a new set of internet gateway routing protocols, electronic mail and internet host name servers among a number of other parallel efforts.

There are currently 24 Working Groups within the IETF, comprised of volunteer researchers (industry and university), government agency representatives, government contractors, vendors, and users (managers of both campus and wider area nets). Plenary meetings are held quarterly and the ambiance is somewhat that of a Usenix conference that focuses solely on networking. The group has grown from what was originally a purely technical group of approximately 25 DARPA contractors (organized and chartered by DARPA) to an attending membership of 120-160. (Membership is open and at no cost to the participant.) The IETF is now endorsed and sponsored by the Federal Research Internet Coordinating Committee (FRICC), a consortium of government agencies whose goal is to sponsor national networking infrastructure for scientific research.

For more specific details on IETF contact *ietf-request@venera.isi.edu*.

Federation of American Research Networks (FARNet)

FARNet is an organization currently consisting of twenty-five so-called "midlevel" networks, such as CERFnet, who provide access from local networks to the national research and education network community (the Internet). The purpose of the Federation is the advancement of science and education through the aiding of communication among research and educational organizations. The Federation endorses the coordination and interconnection of regional and backbone networks to encourage the formation of a unified network environment, thus providing enhanced access to scientific and educational resources, both nationally and internationally.

CERFnet Participation in Outside Organizations

California Internet Federation (Calinet)

Chairperson: Russ Hobby

The California Internet Federation of computer network organizations has the purpose of providing coordination and support of educational and research networking in California. California is recognized as a leader in high technology. To maintain this leadership, however, California's educational and research institutions require the communication tools to share information, resources and ideas. Isolated facilities can no longer compete in today's fast paced age of information. The California Internet Federation has been formed to insure that high quality communication tools are available for education and research to keep California in its position of leadership in these areas.

California Internet Federation Objectives

1) Coordinate interconnection of educational and research networks in California. Areas of coordination include:

a) Design of cost-effective and reliable interconnection among these computer networks.

b) Assist with agreements among network administrations in support of interconnections.

c) Implementation of connections and routing strategies.

d) Management schemes for the connection of interconnected networks.

2) Provide coordination for the connection of California networks with national and international networks.

3) Support of educational and research networking by promoting:

a) Use of standards and compatibility of networks.

b) The understanding of internetwork technologies.

c) Dissemination of information about resources available via the Internet.

d) Development of new resources available via the Internet.

e) Collaboration between private and public sectors.

4) Increase visibility of internetworking and demonstrate its importance to California.

ORION, UCLA Library Online Information System

ORION, the UCLA Library Online Information System, contains over three million bibliographic records for materials owned, inprocess, or on order in the 18 UCLA libraries, including, for many libraries, information about whether items have been charged out and when they are due back in. ORION also supports separate databases with records of other campus information resources. All records are keyword Boolean searchable. Access to ORION requires an account and password and is subject to usage charges, with a $25/month minimum for non-UCLA users. For more information, including a fact sheet and account application form, contact ORION User Services at (213)825-7557 or ecl1ous@oac.ucla.edu.

The *Hitchhikers Guide to the Internet* is a Request for Comments (RFC). RFCs are available online and cover a variety of subjects. This guide is RFC 1118 and is an introduction to the Internet.

How to get RFCs from SRI

Many RFCs are available online; if not, this is indicated by (Not online). Paper copies of all RFCs are available from the NIC, either individually or on a subscription basis(For more information, contact NIC@NIC.DDN.MIL.) Online copies are available via FTP or Kermit from NIC.DDN.MIL as RFC:RFC####.TXT (#### is the RFC number without leading zeroes).

Additionally, RFCs may be requested through electronic mail from the automated MIC mail server by sending a message to SERVICE@NIC.DDN.MIL with a subject line of "RFC ###"
(This parapgraph is an excerpt from the RFC-Index file, which explains all of this.)

[This guide can be retrieved via anonymous ftp to NIC.CERF.NET in the subdirectory cerfnet/cerfnetguide, filename hitchhikers-guide.txt.]

❒ **Internetworking with TCP/IP Principals, Protocols, and Architecture**
by Douglas E. Comer.
(Prentice Hall, Englewood Cliffs, New Jersey 07632.)

❒ **A Directory of Electronic Mail Addressing & Networks**
by Donnalyn Frey and Rick Adams.
(O'Reilly & Associates, Inc. 632 Petaluma Avenue, Sebastopol, California 95472.)
This book, a Nutshell Handbook, provides readers with a directory to approximately 100 research and educational networks, plus a few commercial networks.

The book will allow readers to become more familiar with networks they can use to reach other people around the world. It also assists readers in finding someone else's electronic mail address and sending mail. The book is in an easy-to-use short-reference format and will be updated every 6-10 months. Updating will mean greater accuracy. It should be of use to system administrators who field electronic mail questions, researchers who want to get in touch with other researchers, conference attendees with many contacts, and others who routinely send electronic mail. Each network section contains general information on the network, address format, connections to other sites or networks, facilities available to users, contact name and address, cross-reference to other networks, and the date of the last update. Also included is a three-way index to network name, network type, and country.

The book was released in mid- September. For more information on this book, contact the publisher, O'Reilly & Associates, at 617-354-5800, or, in the US, call toll-free 1-800-338-6887, or, in California, call 1-800-533-6887.

❒ **The Matrix: Computer Networks and Conferencing Systems Worldwide**
by John S. Quarterman. Digital Press, 1989.

Internet Resource Guide

The NSF Network Service Center (NNSC) produces the *Internet Resource Guide*, which educates users and others on the resources available on the Internet. Included in this document are descriptions of computational resources (such as the San Diego Supercomputer Center), regional networks (such as CERFnet) and library catalogues (such as MELVYL®). The guide is available via electronic mail and anonymous ftp. To receive it by e-mail, send a request to resource-guide-request@nnsc.nsf.net.

Please follow the directions listing in the *Internet Resource Guide* to keep your version current

[This guide can be retrieved via anonymous ftp to NIC.CERF.NETin the subdirectory cerfnet/cerfnet_guide/resource_guide. Read theREADME file before retrieving the guide.]

Internet-Accessible Library Catalogs & Databases

Internet-Accessible Library Catalogs and Databases is coauthored by Dr. Art St. George of the University of New Mexico and Mr. Ron Larsen of the University of Maryland. Dr. St. George says this document "began as an effort to provide additional service to the network community locally. However, it became apparent that the library resources were of broader appeal than that."

It contains a listing of approximately 100 online library catalogs and databases available within the United States and is organized by state, and then by catalog and database source. Each listing gives a brief description of the resource and instructions on how to access it, as well as places to contact for more information. Listings include such material as Columbia University's online library catalog (CLIO), Pennsylvania's State University online card catalog system (PENpages), and the Colorado Alliance of Research Libraries (CARL) and its 25 individual resource listings of libraries and information databases, such as the Metro Denver Facts database.

Internet-Accessible Library Catalogs and Databases is available via anonymous ftp to nic.cerf.net in the subdirectory *cerfnet_guide*, and filename Internet_Accessible.txt. Portions of this document appear in the *Internet Resource Guide* produced and distributed by the National Network Service Center (NNSC). (Contained in this guide.)

This catalog is an ongoing project. If you have any suggestions, comments, or additions, please direct them to Dr. St. George by electonic mail to stgeorge@unmb.bitnet.

[This catalog can be retrieved via anonymous ftp to NIC.CERF.NET in the subdirectory cerfnet/cerfnet_guide, filename internet-accessible-catalog.txt (for text version) and internet-accessible-catalog.ps (for postscript version).]

NSFNET Information

Electronic mail
nis-info@nis.nsf.net

Online Information
nis.nsf.net

NSF Network Service Center (NNSC)
NNSC is located at the BBN Systems and Technologies Corporation and is a project of the University Corporation for Atmospheric Research (UCAR) under contract to the National Science Foundation. NNSC can provide you with more information on the NSFNET. How to reach NNSC:
Hotline: (617) 873-3400
Electronic Mail: nnsc@nnsc.nsf.net
U. S. Mailing Address: NSF Network Service Center
BBN Systems Technologies Corporation
10 Moulton Street
Cambridge, MA 02138

Newsletter
nnsc@nnsc.nsf.net
Use this e-mail address to request *NSF Network News*. This newsletter is published four times a year by the NSF Network Service Center (NNSC). To request this newsletter send a request to *nnsc.nnsc.nsf.net*.

MERIT

Merit Computer Network, a consortium of eight Michigan universities, manages and operates NSFNET for the National Science Foundation, along with MERIT's two corporate partners, IBM and MCI. Additional funding is provided by the State of Michigan Strategic Fund. How to reach MERIT:
Telephone: 800-66 MERIT
Electronic Mail: nsfnet-info@merit.edu
U. S. Mailing Address: Information Services
The MERIT Computer Network
1075 Beal Ave
Ann Arbor, MI 48109-2112

Newsletter
NSFNET-Linkletter-Request@merit.edu
Use this to request MERIT's monthly newsletter, *Linkletter*.

Transmission Control Protocol (TCP) and the User Data Protocol (UDP). More than one transport protocol can be used on an IP network at the same time. Each IP packet contains a field indicating which transport protocol is being used so that the receiving host can figure out how the packet should be processed.

All transport protocols allow us to indicate unambiguously which application is sending a packet and which application is receiving it. To provide this service, each transport protocol includes a piece of information, called the protocol header, in front of the data in the packet. Among other values, the header contains information (typically a unique identifying number called a *port*) about which applications sent the packet and which one should receive it. Thus, when an IP packet arrives at a host, the host "reads" the protocol field in the IP header plus the port field in the transport protocol header to figure out which application should get the data.

Some transport protocols, such as UDP, provide nothing more than this service. UDP is designed to simply allow applications to send packets to each other. It does not ensure that a packet will get through (indeed, they often get lost), and it only checksums the packet if the sender or receiver requests it. [*Ed. note*: a checksum is a value that a computer generates by running a specific function on your data. Each transport protocol has its own checksum function. Thus, a sender using UDP would run the UDP checksum on his data, generate a checksum value, and incorporate that value in the transport protocol header. The receiver would run the same UDP checksum on the data at this end and check to be sure that the resulting checksum value was the same as the one in the header.] This service is primitive but has a surprising number of applications, such as synchronizing clocks across a network or implementing distributed file systems.

At the other end of the service spectrum is TCP. In addition to providing application-to-application delivery, TCP promises that any data sent will be reliably delivered without errors to the remote end (or, if this is not possible, that the connection will be severed, the idea being that all data should get through or the exchange should fail). Furthermore, TCP promises to deliver all data in the order in which they were sent. To provide this service, TCP uses a system of checksums, acknowledgements, flow-control, and packet-loss discovery mechanisms. Currently, these mechanisms are the subject of active research as computer scientists continue to discover ways to make TCP perform substantially better.

Applications use transport protocols to provide useful services to network users. For example, TELNET, the remote virtual terminal service, allows users to log into a remote host on the network and use their terminals as if they were physically connected to that remote machine. To use TELNET, users run the TELNET program (often called TELNET or tn) on their local machine and specify the remote host to which they want to connect. The TELNET program then establishes a TCP connection to the remote host. This connection can be thought of as a virtual wire stretched from your terminal, through your machine, and across the network to the terminal driver on the remote machine. While real wires use some simple protocols to ensure that data are properly exchanged between your terminal and your host, TELNET provides similar services over a virtual wire. Services such as remote or local echo of characters are negotiated over the TCP connection between the two TELNET peers.

Readers interested in a more comprehensive overview are encouraged to look at Andrew Tanenbaum's *Computer Networks*, which, while somewhat out of date, is still a good general introduction to computer networks. Those interested in detailed information can read the specifications for the various network protocols and applications mentioned here. These specifications are called Internet Requests For Comments (RFCs) and are available from the Network Information Center (NIC) at SRI International and the NNSC, and from information centers on many of the regional networks.

CERFnet would like to thank Karen Roubicek of NSF Network News for allowing us to reproduce this article here.

User's Introduction to the NSFNET

Excerpted from *NSF Network News.*

In theory, computer networks should behave like telephone networks. They both provide communication services, but a user does not need to understand how these networks operate to use their services. Nonetheless, people are often curious about how a network is put together, or, in less benign cases, they find themselves trying to figure out why they can't connect to another machine. This article attempts to answer some of those questions and explain network concepts and buzzwords.

How the Network Is Constructed

NSFNET is part of a larger network of networks, called the Internet. The Internet comprises several interconnected wide-area networks such as ARPANET, the MILNET, and the SATNET, and the various local area networks like Ethernets, that are attached to them. The term NSFNET is generally used to refer to the portion other than the Internet that relies on the NSF backbone network, a wide-area network that links the national supercomputing centers.

Various regional networks such as SURAnet (the Southeastern Universities Research Association Network) and NYSERNet (the New York State Educational and Research Network) link institutions in a geographical area. These regional networks are interconnected by the NSF Backbone. Many of the NSFNET sites have connections to other wide-area networks.

Each component network of NSFNET supports IP, the Internet Protocol; i.e., each component network has a mechanism that permits IP packets to be passed between hosts on the network. These component networks are linked together using gateways (also called routers), which are special (often dedicated) hosts that know how to move IP packets from one component network to another.

The method by which the system decides how to move packets between component networks is called *routing*. Each packet contains a certain amount of information about how to reach machines on other networks, and each network has a distinct IP network number (for example, the ARPANET is net 10). Some machines keep more information than others. Hosts reach a gateway that will handle IP packets destined for hosts on other networks. Gateways tend to know how to reach most networks in the Internet. Special gateways, known as *core gateways*, are required to know how to reach all networks on the Internet, and are used as references by other, less well-informed gateways.

Routing information is maintained dynamically; it changes in response to changes in the network, such as gateway crashes and changes in traffic load.

One of the most common network problems is that corrupted routing information can get passed around the network and effectively disconnect some parts of the networks (because no one knows how to reach them). Another common problem is that nonoptimal routing information may be circulated, causing IP packets to take circuitous routes to their destination.

Even after the routing information is right and the packets are correctly and efficiently routed to their destinations, reliable data delivery still remains an issue. IP is not a complete data transfer protocol (and is not intended to be). IP only promises "best effort" delivery, which means that while IP will do its best to get the packet to its destination, the packet may be lost, damaged, or discarded in transit. That level of reliability is not good enough for many applications—we usually want to be sure that all the data gets to its destination. In addition, IP only moves data between hosts (the computer to which your terminal is connected and the computer to which the sender's terminal is connected), while we want to move data between applications (your mail program, for example, and the sender's mail program). IP thus acts like the zip code on a letter, ensuring only that the letter arrives at the right post office; it doesn't ensure that the letter will reach the right person in the town served by that post office.

Transport protocols are used to provide the reliability and application-to-application services not provided by IP. Examples of transport protocols are the

-Sample Form-

Request for Cal Poly State University
San Luis Obispo, CA
Change to Connected Network

This form is being submitted to change the status of non-connected network number 129.65 to connected status. We plan to be hooking in to the Internet via San Diego Supercomputer Center in the next 2 weeks. If there are any problems, please send them to me (steve@polyslo.CalPoly.EDU). We request that the same network number be used.

Thanks,
Steve DeJarnett , System Administrator
Cal Poly State University
Computer Science Dept.- Computer Systems Lab
San Luis Obispo, CA 93407
(805) 756-7180
steve@polyslo.CalPoly.EDU

1) If the network will be connected to the DARPA Internet or the DDN Internet, you must provide the name of the sponsoring organization, and the name, title, mailing address, phone number, net mailbox, and NIC Handle (if any) of the contact person at that organization. This is the contact point for administrative and policy questions about the authorization for this network to join the DARPA Internet or the DDN Internet.

Sponsoring Organization:
Org: National Science Foundation
Name: Dr. Stephen S. Wolff
Title: Director, Division of Networking and Communication
MailAdd:NSF
1800 G Street, NW
Washington, DC 20550
Phone: (202) 357-9717
NetMail:steve@brl.arpa
NIC: SSW

8) Gateway information:

8a) A description of the Gateway that connects the new network to the DARPA Internet or the DDN Internet, and the date it will be operational. The gateway must be either a core gateway supplied and operated by BBN, or a gateway of another Autonomous System. If this gateway is not a core gateway, then some gateway in this gateway's Autonomous System must exchange routing information with some core gateway via EGP.

We use a cisco HES gateway to the San Diego Supercomputer Center. This will gateway to their local network, and from there to the DARPA Internet. This will be operational by Sept. 1, 1988.

8b) A description of the gateway machine, including
(a) hardware: cisco HES gateway.
(b) addresses: 92.12.207.11 on NSFnet/
ARPANET
(c) software: cisco-supplied software,
Release 6.2(105)

10) Unless a strong and convincing reason is presented, the network (if it qualifies at all) will be assigned a class C network number. Is a class C network number acceptable for your purposes, and if not why not? (Note: If there are plans for more than a few local networks, and more than 100 or so hosts, we strongly urge you to consider subnetting. [See RFC 950]) Class B address already assigned (129.65). Subnets already in existence, so we request that network number remain a Class B address.

12) What is the purpose of the network? To economically connect computers used in research projects to the NSF Internet to provide communication capability with similar projects at other Universities.

Conclusion

I hope this has helped those of you who are trying to get up to speed on the whole thing. We went around in circles a few times trying to get things set up and running, but it appears that everything is finally in order. I hope this will help some of you avoid some of the major pitfalls that we ran into.

This article was written by Steve De Jarnett then of CSU San Luis Obispo.

DDN Internet (MILNET)) will be filled in with the information you obtained about your sponsor. Also, you will need to tell them what kind of gateway hardware you will be using (see below). You then need to send it to HOSTMASTER@SRI-NIC.ARPA. The following is a sample application (note: this is only a partial form. The rest should be composed of what you said when you initially applied for the network number) Also, send a copy of this form to Susie Arnold of CERFnet so she can notify the NSF.

Becoming Physically Connected

Once your cisco box is installed it must be configured in order to pass network traffic. Configuration information is specific to a given site and generally CERFnet staff will be responsible for configuring your cisco box.

Setting up a Domain Nameserver

The last great challenge is setting up your domain nameserver. Since you have a domain, you need to define a nameserver that is authoritative for your domain. This is generally one of your computers (most likely a Unix machine, but there are no requirements that this be the case) that also runs nameservice software. The overhead produced by this is not too high, although on smaller systems you may see more performance impaction, especially during busy portions of the day. The actual configuration of the software is left to you (since you know your machine much better than any of us do), however, note that this is not an easy process. Your best bet is to read the manuals on BIND and named (part of BIND) from Berkeley (since this is (presumably) the software you will be using). Once that is complete, you could ask any questions you might have to OPS@cerf.net. This is the CERFnet technical mailing list.

Once this is working, you need to register this Domain Nameserver with the NIC. To do this, submit forms in the form of (NOTE: submit in all CAPS):

HOST : Address : Machine Name :
Hardware type : OS : Services :

Where:
HOST = hostname (e.g. polyslo, csufres, etc.)
Address = Internet Address of the machine (e.g. 129.65.17.1)
Machine Name = hostname + domain name (e.g. polyslo.calpoly.edu)
Hardware Type = Processor Info (e.g. Pyramid 98x)
OS = Operating System running on host (e.g. Unix, TOPS-20, VMS)
Services = Functions provided by your system that other systems can remotely use — e.g.TCP/TELNET,TCP/FTP,TCP/SMTP,TCP/FINGER,TCP/TIME, etc

You are also (technically) required to have a Secondary Nameserver. This should be another of your machines running a nameserver. If you don't have 2 machines that can run nameservice, or if you have none at all, you should send a note to OPS@cerf.net, asking for one of the other sites to act as your nameserver. You should definitely try to get at least a primary nameserver running on your campus. Since other machines may be down from time to time, and you don't want to lose access to your machines.

Currently, the latest version of the Berkeley named can be obtained from polyslo.calpoly.edu. This can be UUCPed or (in very extreme cases) sent by tape, providing you supply the tape, and that you can read Unix tar-format tapes (it is also available for anonymous ftp from ucbarpa.berkeley.edu, but if you could do that, you probably wouldn't be going through all of this, now would you?)

Setting up Internet Mail

For this one, you're pretty much on your own. Basically, this consists of changing sendmail, but anyone who has ever dealt with sendmail knows that this is nothing to be taken lightly. The best place to start would be the sendmail.cf file that can be obtained from SRI-NIC.ARPA (26.0.0.73). There are a great number of files that can be obtained from SRI. They include:

- ❒ All Internet RFCs (Requests for Comment)
- ❒ Various files detailing what a "good" Internet site should do.
- ❒ The DDN Host Table
- ❒ Various programs for obtaining information about sites and networks
- ❒ Lots more miscellaneous stuff

You should definitely spend some time looking around their archive.

How to Internet: A Recipe for Campus Connection

By Steve DeJarnett

"How exactly do I connect to the Internet?" Since the topic has come up, and since I appear to have been the latest one to have done it, I guess I should share my experiences. In response to those of you who are new to the CERFnet (and Internet) game, I put together this "how to" as a recipe for how to get your campus connected. There are no guarantees this is fully correct but if you find any errors, I'd appreciate hearing about them. Nevertheless, I think it covers the main points.

Getting an Internet Address

You should get an Internet-registered address. You need to decide what type of address should be requested. There are three types of addresses:

- ❒ Class A Network—65,536 hosts or more (almost unobtainable)
- ❒ Class B Network—256 - 65,535 hosts
- ❒ Class C Network—1 - 255 hosts

The Network Information Center (NIC for short) will try to convince you to take a class C address if you don't know what you want or can't make a somewhat decent argument for a class B. There's not a snowball's-chance-in-a-machine-room that the NIC will give you a class A address, so don't bother asking (How many of us could even fathom their campus having enough hosts to rate a class A address?) Most CSU campuses will want a class B address, simply because the possibility of your campus getting more than 255 hosts within the next few years, is probable (especially with some types of network hardware). Even if you think the chances of your exceeding 255 hosts are nonexistent, get one anyway. Technology changes so fast, you never know what you'll be working with this time next year. Therefore, state that you think you'll have something like 200 hosts within 5 years. This seems to work.

To get the application for an Internet address, send mail to HOSTMASTER@SRI-NIC.ARPA and ask them for the Internet Address Application Form.

A note on filling this application out: There is an item on the form that asks for your sponsor. This is necessary to be advertised on the Internet and on NSFNET. You should consult with CERFnet. Contact help@cerf.net for assistance. Once you have done this, skip to part III (Becoming Physically Connected).

Registering an Existing Network as a Connected Network

If you already have an Internet Address, but do not have it registered as a Connected Network, you will need to do this before you can have the network "advertised" as being connected.

This is necessary to do any form of communication with the Internet. The reason for this is that, until you are advertised, you can send *stuff* out to people, but they cannot figure out how to get back to you. This leads to a less-than-useful connection.

The proper procedure for this entails getting a "Sponsor" to sponsor your existence on the Internet and NSFNet (mentioned above). This is normally someone at DARPA, NSF, or another Federal Government Agency associated with the Internet. This can be easily arranged by talking to Susie Arnold at CERFnet. She should have all of the necessary information (our sponsor, for instance, is Dr. Stephen Wolff of the NSF).

At this point, you must submit a new Internet number request form to HOSTMASTER@SRI-NIC.ARPA. In this form, the section you left blank when you got the number (Section I, which talks about who your sponsor will be if you are going to connect to the DARPA Internet (ARPANET, or the Internet) or the

Other Network Information Services

This section contains various useful information including how to get an IP address, an introduction to the NSFNET, MERIT/NSFNET information services, and guides to the resources available on the Internet.

- How to Internet: A Recipe for Campus Connection
- User's Introduction to the NSFNET
- MERIT and NSFNET Information Services
- *Internet Accessible Library Catalogs and Databases*
- *Internet Resource Guide*
- Bibliography of Suggested Readings
- *Hitchhiker's Guide to the Internet*
- *ORION, UCLA Library Online Information System*

Seminars & Workshops

CERFnet sponsors quarterly seminars on network related issues. Information about CERFnet seminars is distributed overinfo@cerf.net and is announced in the *CERFnet News*.

Online Information

Information is available online via anonymous ftp to nic.cerf.net. The following subdirectories exist:

cerfnet_guide
To retrieve sections or all of the *CERFnet User's Guide*.

cerfnet_news
To retrieve text and postscript versions of the CERFnet newsletter, *CERFnet News.*

cerfnet_stats
To retrieve network management reports and operational information.

cerfnet_info
To retrieve miscellaneous documents. (For example, a glossary of network terms, topology map.)

Hotline

(619) 534-5087

This hotline is used to reach any of the CERFnet staff for general business or to report network operation problems.

FOR MORE INFORMATION ON THESE SERVICES, AND/OR TO BE ADDED TO ANY OF THESE MAILING LISTS, CONTACT THE CERFNET HOTLINE AT (619) 534-5087 OR SEND YOUR REQUEST TO HELP@CERF.NET.

Network Information Center

Publications

In December 1988, CERFnet began production of its bimonthly newsletter called the *CERFnet News*. The newsletter includes such information as interviews with users, profiles of member institutions, network-related technical information, activity within the CERFnet organization, and information about access to online resources.

The newsletter is distributed electronically and in hard-copy. Literary contributions to the newsletter are accepted and welcomed. Back issues of the newsletters are available in electronic form via anonymous ftp to *nic.cerf.net* in the subdirectory *cerfnet_news*. Type *cd cerfnet_news* to change to this directory. The filenames for the postscript and text versions are in the format Month-MonthYear.txt (text version) and Month-MonthYear.ps (for postscript version). For back issues in hard-copy contact the CERFnet office.

CERFnet brochures are also available upon request. Electronic versions of CERFnet brochures and miscellaneous information is available via anonymous ftp to *nic.cerf.net* in the subdirectory *cerfnet_info*.

Network Management Reports

CERFnet produces weekly network management reports that summarize network activity for a particular week. Included in these reports are network statistics, site outages, circuit outages, and miscellaneous network activity. These reports are distributed via electronic mail over theops@cerf.net mailer. Reports can also be retrieved via anonymous ftp to *nic.cerf.net* in the *cerfnet_stat* subdirectory. Type *cd cerfnet_stats* to change to this directory. The filenames are in the format Day-Month-Year.txt, for example 18-Sept-89.txt.

CERFnet Mailing Lists

ops@cerf.net
Is used to distribute and discuss technical and operational information about CERFnet. It is also used to distribute management reports. Anyone at your site who is technically involved with your CERFnet connection should be on this list.

info@cerf.net
Is used to distribute miscellaneous information, such as meeting and seminar announcements. Anyone at your site who may be interested in this type of information should be on this list.

help@cerf.net
Is used to subscribe to any of the CERFnet mailers, to obtain information on CERFnet, and to reach CERFnet personnel for reporting and discussing operational problems with CERFnet.

guide@cerf.net
This mailer will also be used to distribute announcements about updates to this user's guide.

Problem Resolution Procedures

Hotline Number: (619) 534-5087
Electronic Mail: help@cerf.net

CERFnet maintains a 24-hour hotline. CERFnet members and interested parties are encouraged to use the hotline for both urgent technical problems and general information. During regular business hours calls are usually answered directly. If a call is not answered directly, you may leave a message on the hotline voice-mail.

After hours, contact the San Diego Supercomputer Network Operations at (619) 534-5090 and a systems operator will assist you.

When troubleshooting, before calling the hotline, be sure you test connections by using the IP address of the site, not its name. This will eliminate any name service problems.

When reporting troubles, you may be asked the following questions:

1. What are the symptoms?
2. Can you reproduce this problem?
3. Has any work been done in the general vicinity of the cisco box? the CSU/DSU?
4. What lights are displayed on the CSU/DSU? the cisco box?
5. What sites are unreachable?

We may ask you to reboot the cisco box and/or the modem.

Remember - SRI-NIC doesn't always answer ping packets, so don't use this as a trouble shooting site.

Send mail to help@cerf.net if you have questions. Someone from the CERFnet staff will respond as soon as possible.

Additionally, backbone sites should send e-mail tohelp@cerf.net to alert us of scheduled down times that will affect other sites.

CERFnet - Acceptable Use Policy

Purpose of CERFnet

"The purpose of the California Education and Research Federation is to advance education and research in general by assisting in the interchange of information among research and educational institutions by means of high-speed data-communications and related telecommunications techniques."

This statement represents a guide to the acceptable use of the CERFnet facilities.

(1) All use must be consistent with the purpose of CERFnet.

(2) The intent of the use policy is to make clear certain cases which are consistent with the purpose of CERFnet, not to exhaustively enumerate all such possible uses.

(3) The Chairperson of CERFnet and his designees, may at any time make determinations that particular uses are or are not consistent with the purpose of CERFnet . Such determinations will be reported in writing to the Board of CERFnet for consideration and possible revision at the next meeting of the board.

(4) If a use is consistent with the purpose of CERFnet, then activities necessary to that use will be considered consistent with the purpose of CERFnet. For example, administrative communications which are part of the support infrastructure needed for research and instruction are acceptable.

(5) Use for scholarly and scientific research or instruction at institutions of research or instruction is acceptable.

(6) Use for a project which is part of or supports scholarly and scientific research or instruction activity for the benefit of an institution of research or instruction is acceptable, even if any or all parties to the use are located or employed elsewhere. For example, communications directly between Subscribers engaged in support of a project for such an institution is acceptable.

(7) Use for scholarly and scientific research or instruction at for-profit institutions may or may not be consistent with the purpose of CERFnet, and will be reviewed by the Chairperson or his designees on a case-by-case basis.

Adopted May 12, 1988
CERFnet Board of Directors
Ref:1-16-89I

User Liaison Responsibilities

The user liaison at each site must ensure that all CERFnet users are educated on the acceptable use of CERFnet. CERFnet users are responsible for adhering to the terms and conditions listed in the CERFnet -Acceptable Use Policy (shown below). Failure to adhere to these terms and conditions may result in disconnection from the network.

The user liaison should be available to consult with users in person, by telephone, and by electronic mail. The user liaison may also be needed to teach introductory workshops for users on their campus. Also, they are responsible for working on documentation for users, including introductory guides and detailed reference manuals.

Helpful Hints

1. Make a folder.

   - ❒ Keep CERFnet information in one spot.
   - ❒ If someone else becomes the user liaison for your organization, let us know and pass the folder on the the new liaison.

2. Let your users know what is available from CERFnet.

   - ❒ We will send you CERFnet newsletters and periodic online announcements.
   - ❒ Please pass this information along to the user support or computer center personnel in your organization for inclusion in newsletters, billboards, or login banners.

3. Let CERFnet know what your users say about the network and its services.

   - ❒ Is it easy to use? Hard to use?
   - ❒ What services or information would users like to have? In what format?
   - ❒ Comments to: cerf-help@sds.sdsc.edu

Technical Liaison Responsibilities

Each site is responsible for providing the interconnection to the gateway, including necessary protocol conversion. The technical liaison will assist in the network and communications coordination and troubleshooting and will act as the consulting focal point, answering questions from users on campus or interfacing with the network manager to find the answers.

In addition, the liaison will need to have access to the cisco box and CSU/DSU. The liaison should have a basic understanding of communications and TCP/IP, and have an electronic mail address.

There are one or two contacts at each site. This will keep CERFnet from answering questions from the general public, and cut down on the number of unnecessary phone calls.

CERFnet is planning on placing modems at each site for use of CERFnet management to dial into the console port on the cisco box. The liaison may need to reset this modem from time to time.

The liaison should call the hotline number when there are troubles. If the liaison is replaced by somebody else, CERFnet staff should be notified as soon as possible, so that a site doesn't remain in the dark on networking events.

Organization	*Representative*
University of San Diego	**Jack Pope** Alcala Park Serra Hall, Room 118E San Diego, CA 92110 (619) 260-4810 pope@usdcsv.acusd.edu
Walt Disney Imagineering	**Scott Watson** 1401 Flower Street Glendale, CA 91221-5020 (818) 956-6790 scott@disney.com
Xerox Corporation	**David Stokes** 10200 Willow Creek Road SD-5038 San Diego, CA 92131 (619) 695-7829 stokes.sd@xerox.com

Organization	*Representative*
Science Horizons	**Kevin Sweet** 710 Encinitas Blvd Encinitas, CA 92024 (619) 942-7333 sweet@neri.horizon.com
Supercomputing Solutions	**Martin Morris** 6175 Nancy Ridge Rd San Diego, CA 92121 (619) 452-7100
University of California Office of the President	**Michael Shannon** 300 Lakeside Drive Room 383 Oakland, CA 94612-3550 (415) 987-0371 ccpmms@uccvma.bitnet
University of California at Irvine	**David Walker** Network and Telecommunications Services Irvine, CA 92717 (714) 856-7037 dhwalker@uci.bitnet **Dave Tomcheck** Network and Telecommunications Services 2209 Central Plant Irvine, CA 92717 (714)856-5555 tomcheck@ucivmsa.bitnet
University of California at Los Angeles	**Luis Llambias** 405 Hilgard Avenue MSA 5623 Los Angeles, CA 90024-1557 (213) 825-1604 cnetlal@oac.ucla.edu
University of California at Riverside	**Claudia Jordan** Telephone Building Riverside, CA 92521 (714) 787-4100 cjordan@ucrvms.ucr.edu
University of California at Santa Barbara	**Vince Sefcik** Communication Services Santa Barbara, CA 93106 com1vs@ucsbvm.bitnet
University of California at San Diego	**Jim Madden** Academic Network Operations B-028 La Jolla, CA 92093 (619) 534-2684 madden@ucsd.edu

Organization	*Representative*
ISX Corporation	**Scott Fouse** 501 Marin Street Suite 214 Thousand Oaks, CA 91360 (805) 495-8265 sfouse@isx.com
Los Nettos	**Walt Prue** USC/ISI 4676 Admiralty Way Suite 1000 Marina Del Rey, CA 90292-6695 (213) 822-1511 ext. 191 prue@isi.edu
Occidental College	**Tom Slobko** 1600 Campus Road Los Angeles, CA 90041 (213) 259-2880 slobko@oxy.edu
Qualcomm	**Vicki Hutchison** 10555 Sorrento Valley Road San Diego, CA 92121 (619) 587-1121 ext. 229 vicki@qualcomm.com
Quotron Systems Incorporated	**Todd Booth** 5300 McConnell Ave Los Angeles, CA 90066 (213) 302-4368 todd@janus.quotron.com **Harry Felder** 12731 W. Jefferson Blvd Los Angeles, CA 90066 (213) 827-4600
San Diego Supercomputer Center	**Paul Love** 10100 Hopkins Drive La Jolla, CA 92037 (619) 534-5043 loveep@sds.sdsc.edu
Science Applications International Corporation	**Mark Waldschmidt** 10210 Campus Point Drive Mail Stop 42 San Diego, CA 92121 (619) 546-6240 markw@cpva.span

Member Institutions & Representatives to the Plenary

Organization	*Representative*
Agouron Institute	**Rich Showalter** 505 Coast Blvd. So. La Jolla, CA 92037 (619) 456-5318 rich@kanga.agi.org
California Institute of Technology	**Robert Logan** 158-79 Pasadena, CA 91125 (818) 356-4631 bob@iago.caltech.edu
California State University	**Chris Taylor** Chancellor's Office 800 N. State College Blvd. Computer Center M #38 Fullerton, CA 92634 (714) 773-3924 1gtlfct@calstate.bitnet
	Brent Auernheimer CSU Fresno Department of Computer Science Fresno, CA 93740-0109 (209) 294-4636 brent@csufresno.edu
The Claremont Colleges	**Robert Wolf** Computing Services Harvey Mudd College Claremont, CA 91711 (714) 621-8006 wolf@hmcvax.bitnet
Emulex Corporation	**Gil Lawson** 3545 Harbor Blvd Costa Mesa, CA 92626 (714) 688-5458
Hughes Aircraft Company	**Peter Ho** P.O. Box 9399 Long Beach, CA 90810 (213) 816-6431 ho@hac2arpa.hac.com

(Sorry pages 11 through 13 are not available in electronic format.)

	DFN	Holland
	JUNET	Japan
	Finnish University Network	Finland
	AC.UK	United Kingdom
	ASCNET	Australia
	New Zealand Academic Network	New Zealand
	Israeli Academic Network	Israel
MFENET/ESNET	Sponsored by the Department of Energy	
SPAN	Sponsored by NASA	
USENET	International electronic “bulletin board” service	
UUCP	International electronic mail network	

This document was extracted from materials received from NEARNET. CERFnet would like to thank the NEARNET staff for this document.

The Internet & NSFNET

CERFnet is an NSFnet mid-level network and is part of the Internet. The Internet is composed of many administratively and technically diverse networks that intercommunicate using a standard protocol, TCP/IP. Interactive communications, including remote login, file transfer and electronic mail, are everyday occurrences between the various computer networks. Currently, more than 800 networks, 50,000 computers and 70,000 users are part of the Internet. The Internet is composed of the following networks:

Arpanet	Sponsored by DARPA since 1969
Milnet	Sponsored by the Department of Defense
NSFNET	Sponsored by National Science Foundation

The following is a list of NSFnet regional networks and their principal geographic service areas:

BARRNET	Northern California
CERFNET	California
CICNET	Illinois, Iowa, Michigan, Minnesota, Ohio, Wisconsin
CREN IP Sites	International and National
JVNCNET	New Jersey and Southern New England
LOS NETTOS	Southern California
MERIT	Michigan
MIDNET	Arkansas, Iowa, Kansas, Missouri, Nebraska, Oklahoma
MRNET	Minnesota
NCSANET	Illinois, Indiana, Wisconsin
NEARNET	New England
NORTHWESTNET	Alaska, Idaho, Montana, North Dakota, Oregon, Washington
NYSERNET	New York
OARNET	Ohio
PREPNET	Pennsylvania
PSCNET	Maryland, Michigan, Ohio, Pennsylvania
SESQUINET	Texas
SURANET	Southeastern United States
THENET	Texas
USAN	National
WESTNET	Southwestern United States

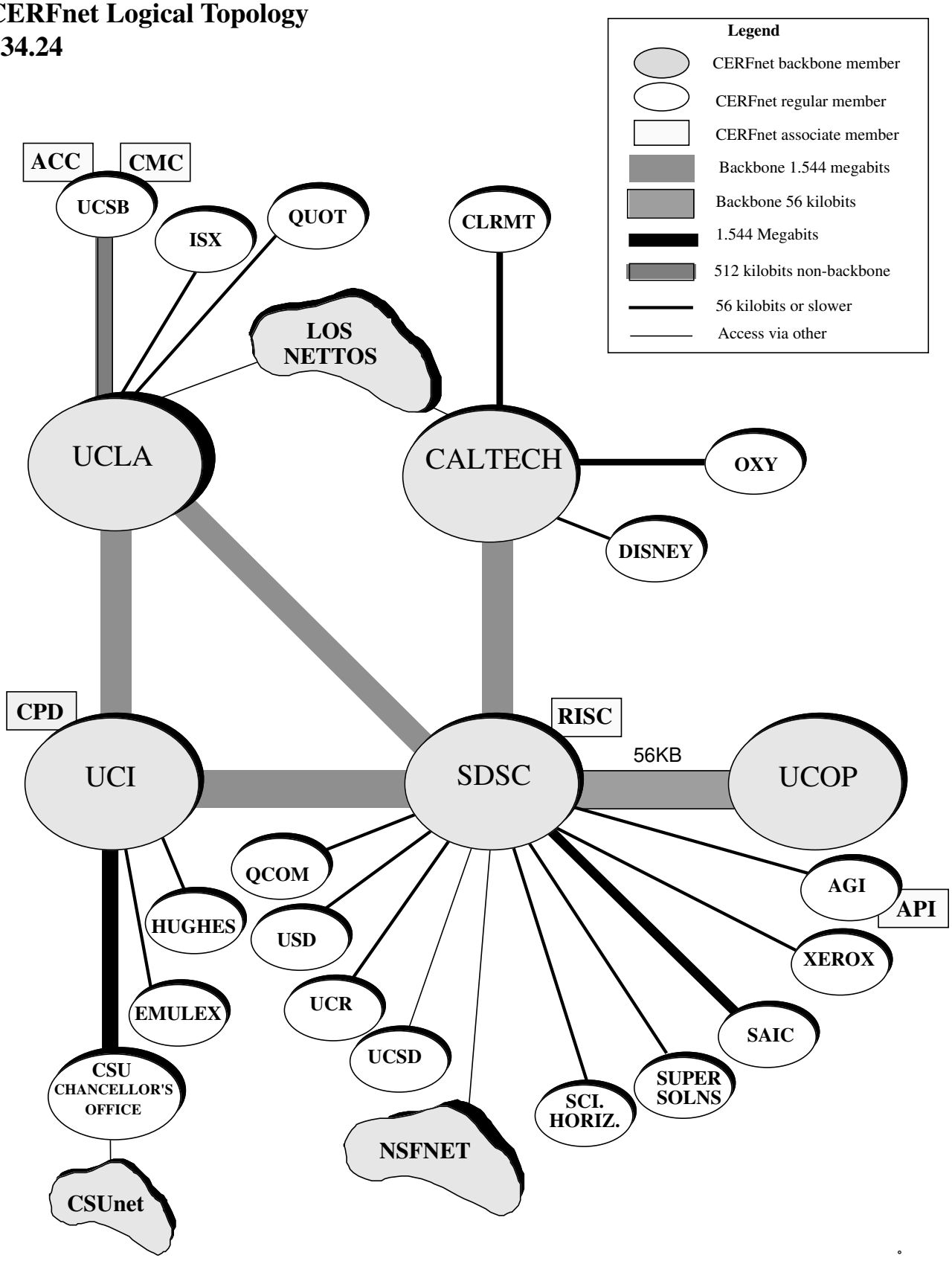
Additional networks that can exchange electronic mail with the Internet include:

BITNET	National network of primarily academic institutions (also NETNORTH, in Canada, and EARN in Europe)
CREN Phonenet	International network of research institutions

CREN International Affiliates are:

CSNNET	Canada
SUNET	Sweden
CHUNET	Switzerland
Inria	France

CERFnet Logical Topology
134.24

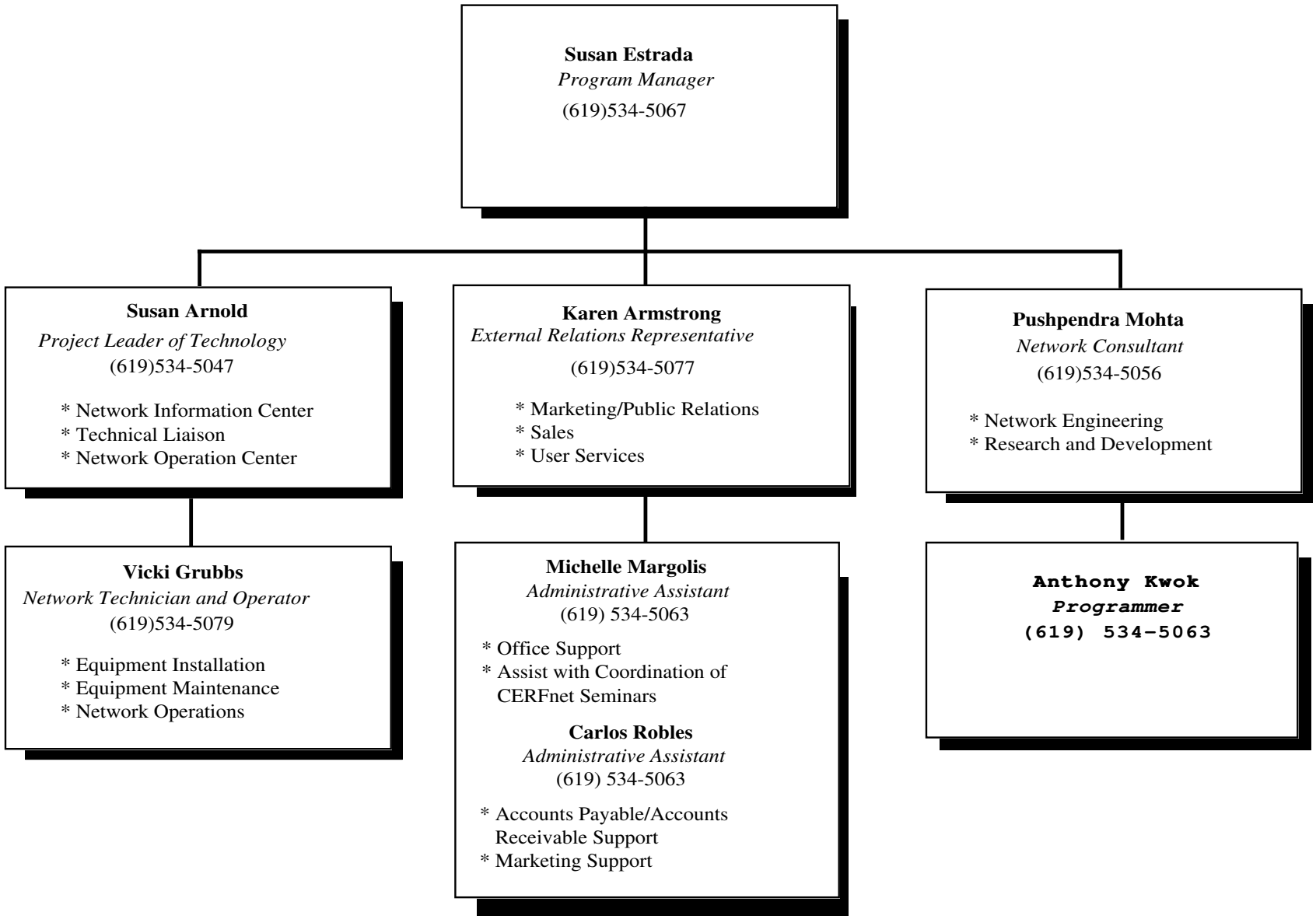


CERFnet Topology

CERFnet Logical Topology Key

ACC	Advanced Computer Communications
AGI	The Agouron Institute
API	Agouron Pharmaceuticals Incorporated
CALTECH	California Institute of Technology
CLRMNT	The Claremont Colleges
CPD	Custom Product Design
CMC	Communication Machinery Corporation
CSU	The California State University's twenty campuses and Chancellor's Office
EMULEX	Emulex Corporation
HUGHES	Hughes Aircraft Company
ISX	ISX Corporation
LOS NETTOS	Los Nettos Network
NSFNET	National Science Foundation Network
OXY	Occidental College
QCOM	Qualcomm Incorporated
QUOT	Quotron Systems Incorporated
RISC	Research Institute of Scripps Clinic
SAIC	Science Applications International Corp.
SCI HORIZ	Science Horizons
SDSC	San Diego Supercomputer Center
SUPER SOLN	Supercomputing Solutions
SWRL	California State University Chancellor's Office SWRL Facility and 20 campus connections
UCI	University of California at Irvine
UCLA	University of California at Los Angeles
UCOP	University of California Office of the President
UCR	University of California at Riverside
UCSB	University of California at Santa Barbara
UCSD	University of California at San Diego
USD	University of San Diego
WALT	Walt Disney Imagineering
XEROX	Xerox Corporation

California Education and Research Federation Network Structure



Administrative Information

Addresses and Telephone Numbers

Mailing Address

California Education and Research Federation Network
c/o San Diego Supercomputer Center
P. O. Box 85608
San Diego, CA 92186-9784

Shipping and Express Mail

California Education and Research Federation Network
San Diego Supercomputer Center
10100 Hopkins Drive
La Jolla, CA 92037

Telephone

Hotline: (619) 534-5087
Fax: (619) 534-5167

Electronic Mail

help@cerf.net

CERFnet Staff

CERFnet currently supports four full-time staff and three part-time staff. The four full-time staff include an executive director, a project leader of technology, an external relations representative, and a network technician and operator. The three part-time staff include a network consultant and two administrative assistants.

Introduction

The CERFnet User's Guide is intended to provide users with useful information on the CERFnet services available, the CERFnet administration, and the technical and operational details of CERFnet. This guide also aims to provide information on the resources available on the Internet and the NSFNET.

This guide is intended to be used in a three-ring binder allowing updates to be issued electronically and easily replace old versions. Notices announcing the updates to the guide will be released over info@cerf.net. Updates will be accessible via anonymous ftp to nic.cerf.net in the sub-directory cerfnet_guide.

Your opinions and recommendations for this guide will be very much appreciated. Please direct your comments to help@cerf.net.

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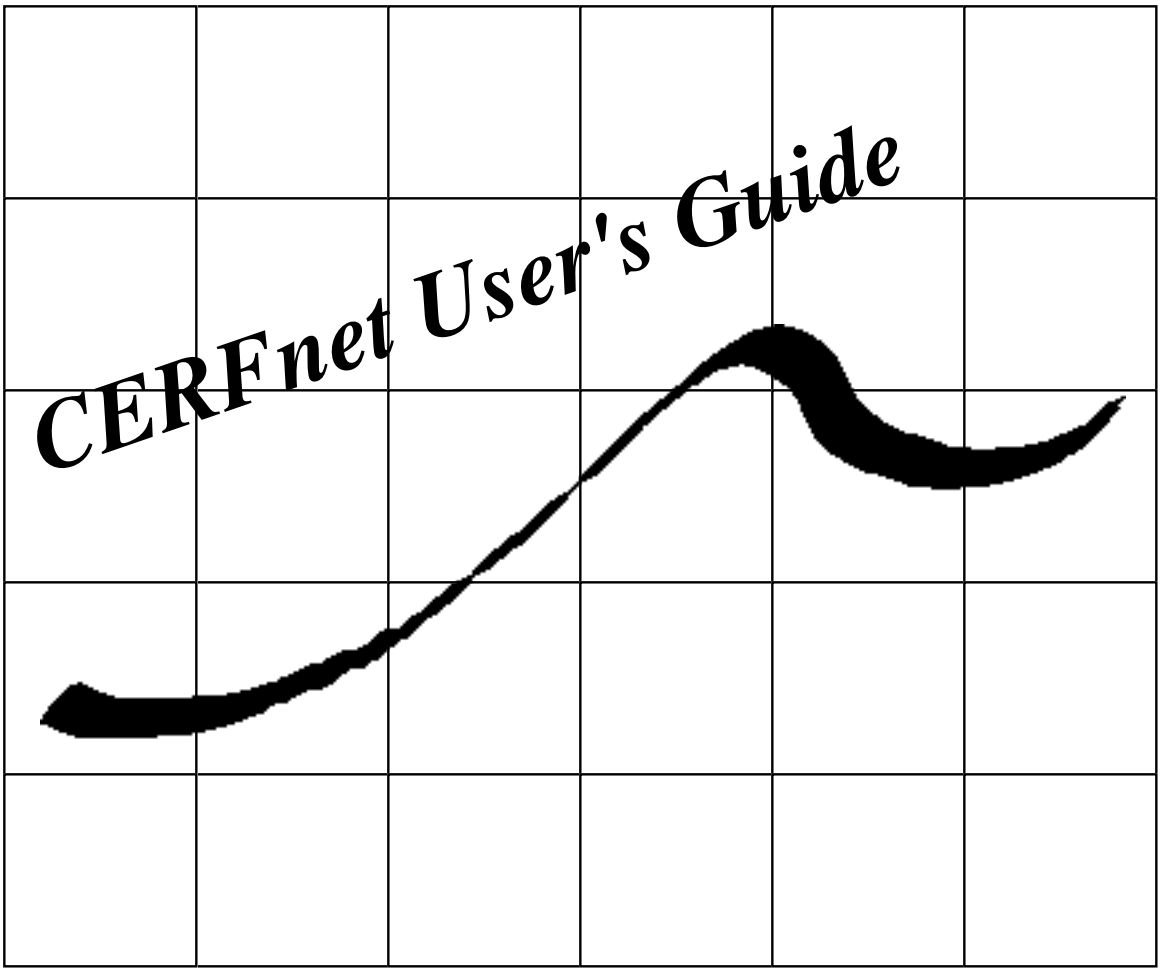
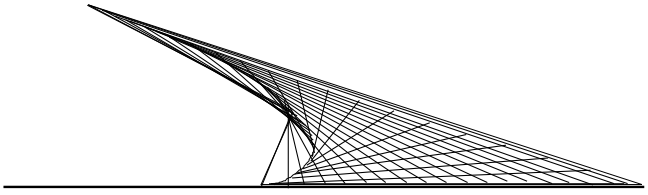
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May 1990