# Sequoia 2000 Network (S2Knet) Handbook

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# Sequoia 2000 Network (S2Knet) Handbook

## 1. Introduction

The construction of the Sequoia 2000 network (S2Knet) is a joint effort involving people from the University of California campuses of Berkeley, Los Angeles, San Diego, and Santa Barbara, the UC Office of the President (UCOP), and the San Diego Supercomputer Center (SDSC). The purpose of this handbook is to serve as a reference, containing up-to-date information describing policy, topology, names, addresses, and routing. It also includes a list of contacts for network management.

### 1.1. Background Information

A lot of discussion has taken place during the design and construction of S2Knet at various meetings. Rather than including the minutes from these meetings in this document, the minutes have been copied to `postgres.Berkeley.EDU:~ftp/pub/sequoia/s2knet-meetings`. Additional minutes will be added to this directory after each S2Knet meeting.

## 2. Definitions

**S2Knet:** The Sequoia 2000 network, including the backbone and local networks fully or partially owned by the S2K project.

**Site:** Any of the major contributers of the S2K project connected to the S2Knet. Currently, these include UC Berkeley, UCLA, UC San Diego, UC Santa Barbara, and SDSC.

**Backbone:** Those parts of the S2Knet which connect the major S2K sites. Initially these are T1 links, but they will be upgraded to T3 links.

**S2Knet Machine:** Any machine which is fully or partially owned by the S2K project and is directly connected to the S2Knet.

**S2Knet Manager:** The person designated by the S2Knet Committee to manage the network. The S2Knet manager will be responsible for solving global problems, coordination of site managers to solve problems, and managing activities that are best done in a centralized manner (see section on job descriptions).

**Site Manager:** A person designated by each site to serve as primary contact for issues relating to local network management. An secondary site manager shall also be designated as an alternate to the site manager. Site managers are responsible for solving local problems, and carrying out requests from the S2Knet manager.

**Decentralized:** An item is said to be decentralized if it is maintained independentdly by the site manager. Most S2Knet management is decentralized.

**Regional NSFNET Connectivity Point:** The network providing connectivity between the NSFNET backbone and the various campus networks. Currently, UCSB and UCLA are connected by CerfNet, Berkeley is connected by BARRNET, and UCSD is connected to the CerfNet hub at SDSC as well as the NSFNET backbone.

## 3. Job Descriptions

The duties of the S2Knet manager and site managers are listed here. See the "Contact List" section for the names and addresses of all managers.

### S2Knet Manager

The S2Knet manager has the following duties:

1. Coordinate site managers to implement design described in this handbook.

2. Serve as the primary contact for problems regarding the backbone or the network as a whole.

3. Monitor the S2Knet, and coordinate the site managers responding to problems.

4. Maintain the backbone, including allocation of names, addresses, and accounts on machines (e.g. routers) on the backbone.

5. Maintain the handbook so that it reflects the current state of the network. In particular, the topologies, machine and network names and addresses, routing tables, and contact list, shall be kept up-to-date.

6. Prepare weekly report which summarize weekly site manager reports on network status. Included should be descriptions of any modifications made to the network, e.g. addition of new machines, addition of subnetworks, renaming or readdressing, etc., and a record of any unusual events which may have occurred during the week. The typical length of this report is a page.

7. Coordinate reservations for time for experimental use of the S2Knet.

### Site Manager

Each site manager has the following responsibilities:

1. Serve as the primary contact for problems regarding the site's local networks.

2. Monitor the site's local networks, and solve any problems which can be taken care of locally.

3. Maintain local networks: administer local names and addresses, and maintain routing tables. Any changes which affect the backbone or the S2Knet as a whole should be coordinated with the S2Knet manager.

4. Carry out requests by the S2Knet manager.

5. Send a weekly report on local network status to the S2Knet manager. Included should be descriptions of any modifications made to local networks, e.g. addition of new machines, addition of subnetworks, renaming or readdressing, etc., and a record of any unusual events which may have occurred during the week. The typical length of this report is a paragraph.

## 4. Policies

This section describes high-level policies regarding the operation of the S2Knet.

### Modes of Operation

The S2Knet backbone has two modes of operation: *normal* and *experimental*. In **normal mode**, all packets generated from or destined to S2Knet machines will attempt to be routed through the S2Knet backbone. In case the S2Knet backbone fails, packets will automatically be routed through an alternative network (e.g. the Internet).

In **experimental mode**, only a group of S2Knet experimenters shall be able to route packets over the backbone. To be a member of this group, one must obtain permission from the S2Knet committee by sending a request to the S2Knet manager. Other traffic presented to the backbone during experimental periods will be routed through an alternative network.

The S2Knet will usually operate in normal mode. A schedule identifying experimental mode periods will be distributed to the S2K project by the S2Knet manager. Abnormal experimental mode periods will be announced by the S2Knet manager as soon as possible by sending mail to the "sequoia-netops" alias. Time during experimental periods shall be reserved by making a request to the S2Knet manager.

**Permissible Traffic (normal mode operation)**

For inter-site traffic, packets transferred between S2Knet machines will be preferentially routed through the S2Knet backbone. Packets traveling between one S2Knet machine and one non-S2Knet machine might be routed across the backbone, although such routes are not guaranteed. Packets between two non-S2Knet machines will never be routed through the backbone.

**Privacy**

S2Knet experimenters may require statistical information on S2Knet utilization. Experimenters are free to collect packet information, such as generation or consumption rate, size distribution, etc. However, network experimenters must respect the privacy of S2Knet users. The contents of packet data shall not be used or distributed to other parties without explicit permission of the originator and the S2Knet manager.

## 5. Topologies

This section contains topological maps showing local network connectivity at each S2Knet site. Site managers should submit a picture indicating the physical network topology, as well as a table indicating additional information: names, interface devices/name, address assignment, netmasks, and broadcast addresses. Be sure to include enough detail to trace a path from your nearest Regional NSFNET Connectivity Point to your S2Knet local network.

### 5.1. S2Knet Backbone

The organization of the S2Knet backbone is shown in pictures that appear in Appendices. The following table shows some of the important structure within the network:

S2Knet Backbone Router Configurations

| Router | Device | Interface-Name | Interface Addr | Netmask | Broadcast |
|---|---|---|---|---|---|
| UCB1 | ln0 | s2k-gw1.cs.berkeley.edu | 128.32.149.127 | 255.255.255.0 | 128.32.149.0 |
| UCB1 | fza0 | gw.s2k.berkeley.edu | 192.150.186.1 | 255.255.255.0 | 192.150.186.255 |
| UCB1 | ds0 | ucb-ucsb.s2k.berkeley.edu | 192.154.4.17 | 255.255.255.248 | none[UCSB1 link] |
| UCSB1 | ln0 | s2k-gw1.ucsb.edu | 128.111.253.60 | 255.255.255.0 | 128.111.253.255 |
| UCSB1 | fza0 | gw1.s2k.ucsb.edu | 192.150.216.24 | 255.255.255.0 | 192.150.216.0 |
| UCSB1 | ds0 | ucsb-ucb.s2k.ucsb.edu | 192.154.4.18 | 255.255.255.248 | none[UCB1 link] |
| UCSB1 | ds1 | ucsb-sdsc.s2k.ucsb.edu | 192.154.4.10 | 255.255.255.248 | none[SDSC1 link] |
| UCSB2 | ln0 | s2k-gw2.ucsb.edu | 128.111.253.70 | 255.255.255.0 | 128.111.253.255 |
| UCSB2 | fza0 | gw2.s2k.ucsb.edu | 192.150.216.23 | 255.255.255.0 | 192.150.216.0 |
| UCSB2 | ds0 | ucsb-ucla.s2k.ucsb.edu | 192.154.4.26 | 255.255.255.248 | none[UCLA1 link] |
| SDSC1 | ln0 | redwood.sdsc.edu | 132.249.20.40 | 255.255.162.0 | 132.249.23.255 |
| SDSC1 | fza0 | [none] | 192.154.4.41 | 255.255.255.248 | 192.154.4.47 |
| SDSC1 | ds0 | sdsc-ucsb.s2k.sdsc.edu | 192.154.4.9 | 255.255.255.248 | none[UCSB1 link] |
| UCLA1 | ln0 | s2k-gw1.atmos.ucla.edu | 128.97.77.253 | 255.255.255.0 | 128.97.77.255 |
| UCLA1 | fza0 | gw.s2k.ucla.edu | 192.154.2.254 | 255.255.255.0 | 192.154.2.255 |
| UCLA1 | ds0 | ucla-ucsb.s2k.ucla.edu | 192.154.4.25 | 255.255.255.248 | none[UCSB2 link] |

Table 1

**5.2. UCSD** The Computer Systems Lab at UCSD has its own network which is organized as follows:

| UCSD/Computer Systems Lab Routing Topology | | | | | |
|---|---|---|---|---|---|
| Router | Device | Interface-Name | Interface Addr | Netmask | Broadcast |
| CSL1 | ln0 | sorrento.ucsd.edu | 132.239.17.94 | 255.255.255.120 | 132.239.17.12 |
| CSL1 | fza0 | sorrento.s2k.ucsd.edu | 192.154.1.201 | 255.255.255.0 | |
| CSL1 | fza1 | [none] | 192.154.4.42 | 255.255.255.248 | 192.154.4.47 |

Table 2

## 6. Physical Connection

At the 1992 Sequoia retreat at Lake Tahoe, the S2Knet committee agreed the standard physical host connection to the S2Knet would be FDDI, with an optional (and expected) attachment to other local networks via Ethernet or another FDDI interface. Ordinary local services (e.g. NFS, mail, etc) as well as non-Sequoia related services are expected to be provided over the Ethernet.

Because the S2Knet backbone is expected to reach T3 rates (45Mb/s) by the fourth quarter 1992, using the Ethernet interface (10Mb/s) for S2Knet traffic would soon become a bottleneck.

Many vendor products support the coexistence of two distinct logical networks over the same physical medium. UCB and SDSC have voiced particular interest in this matter.

### 6.1. Network Security

All S2Knet users should be aware that no special attempts are being made to make S2Knet more secure than the standard Ultrix distribution provides. This means that any passwords sent on S2Knet will not be encoded or hidden, nor will other security enhancing techniques like Kerberos be used.

## 7. Naming

Each interface on each router and host has its own name. Hosts and routers may be reached either via the S2Knet directly, or via NSFnet during periods of S2Knet backbone outages.

### 7.1. Host Naming

Interfaces on S2Knet hosts, as opposed to routers, are named according to the following convention:

- Since S2Knet hosts are assumed to be attached to both the S2Knet as well as a local Ethernet and/or FDDI network, each host will have two names. A host named `foo` is referred to as `foo.DOMAIN.edu` where `DOMAIN` is one of: `atmos.ucla`, `cs.berkeley`, `ucsd`, `sdsc`, or `ucsb`. This name will refer to the Ethernet interface of the host and will be the name of the domain in which local Ethernet-based host are located.

- The S2Knet (FDDI) interface in the above example is referred to as `foo.s2k.CAMPUS.edu`, where `CAMPUS` is one of `ucla`, `berkeley`, `ucsd`, `sdsc`, or `ucsb`. Note the difference between `DOMAIN` and `CAMPUS`. The latter never contains subdomain components that might come under the installations name. For example, at UCB `DOMAIN` would be `cs.berkeley`, whereas `CAMPUS` would be only `berkeley`. Currently this distinction only exists at UCLA and UCB. At all other sites `DOMAIN` and `CAMPUS` are identical.

The relationship between the naming convention and routing and address assignment will be discussed in subsequent sections.

Note that a new subdomain, namely `s2k.CAMPUS.edu` must be created at each site. Responsibility for creating and maintaining the new subdomain namespace is decentralized. See the section on Name Servers for more detail.

### 7.2. Domain Name Service Resolver

In order for a host to make use of names of the style shown above, it must be running the "Domain Name Service Resolver" (DNS). The DNS is a collection of routines that are added to the standard library programs are linked with and enable a process to map between host names and addresses. This is done when a program that has been linked with the DNS asks a "Domain Name Server" for this mapping. A Domain Name Server is nothing but a host running the Berkeley Internet Name Daemon (BIND) program. In this case, the host on which the requesting program is being run is called the "client" and the machine on which BIND is running is called the "server". All hosts in the S2Knet will act as DNS clients, and a few may act as servers as well. Under Ultrix, a machine will act as a DNS client provided the word `bind` appears after the `hosts=` field in the file `/etc/svc.conf`. For example, the `/etc/svc.conf` file on `toe.CS.Berkeley.EDU` is as follows:

```
aliases=local
auth=local
group=local
hosts=bind,local
netgroup=local
networks=local
passwd=local
protocols=local
rpc=local
services=local

PASSLENMIN=6
PASSLENMAX=16
SOFTEXP=604800                  # 7 days in seconds
SECLEVEL=BSD                    # (BSD | UPGRADE | ENHANCED)
```

The resolver configuration file, `/etc/resolv.conf`, contains the domain name of the local host, plus entries containing the IP addresses of nameservers. The `resolv.conf(5)` manual page describes its format in greater detail. For example, the `/etc/resolv.conf` file on `toe.CS.Berkeley.EDU` is as follows:

```
;
; Comments have leading semi-colons
;
domain        CS.Berkeley.EDU
nameserver    128.32.149.117
nameserver    128.32.130.
nameserver    128.32.149.36
```

The `domain` line specifies the domain in which the local host appears, in this case `.CS.Berkeley.EDU`. Hostnames provided to applications (e.g. telnet, rlogin, etc) lacking a complete domain extension will default to the domain specified by this line. For example, the command `telnet foo` would expand invisibly to `telnet foo.CS.Berkeley.EDU`.

Since S2Knet hosts are expected to be participating in two distinct domains, the site manager must decide whether to make the default domain an S2Knet domain (i.e. `s2k.Berkeley.EDU`) or the standard local domain. We suggest using the local domain; avoid placing the `s2k` prefix in the `/etc/resolv.conf` file entirely. Local hosts may then be referred to conveniently as they always have been, and S2Knet hosts must be referred to explicitly with the `s2k` included. For example, for our example machine at UCB to connect to a S2Knet machine at UCB, a user would specify a command like `telnet foo.s2k`, which would expand to `telnet foo.s2k.sdsc.edu`. Placing S2Knet machines in the local naming domain will lessen the burden on the site manager when dealing with configuration files for

NFS, NIS, mail, etc.

### 7.3. Router Naming

Routers are named in a fashion similar to hosts, with special attention paid to the point-to-point interfaces on the S2Knet backbone.

- Point-to-point interfaces are named in the following way: `local_endpoint-remote_endpoint.s2k.CAMPUS.edu`. For example, at UCSB, the UCSB to SDSC (currently T1) link is named `ucsb-sdsc.s2k.ucsb.edu`. At SDSC, the same link is called `sdsc-ucsb.s2k.sdsc.edu`.

- The Ethernet interface on a router is named `s2k-gwN.DOMAIN.edu`. The *N* is the number of the router, where the first router has the number one. Additional routers will be given successive numbers. Other names can be used as aliases for Ethernet interfaces.

- The FDDI interface on a router is named `gw.s2k.CAMPUS.edu`. From a S2Knet host, typing `telnet gw.s2k` will create a connection to the local router using the local S2Knet FDDI. The *N* convention as described above is used if names such as "gw1", etc. are required.

### 7.4. Name Servers

Establishing a new subdomain (`s2k.CAMPUS.edu`) requires the configuration of a name server to support the mapping of host names to addresses (see section on *addressing*). As site manager, you may either run your own authoritative name server responsible for maintaining the `s2k` mappings, or you may ask your campus' network nameserver maintainers to do this for you. The examples below show locations for files as they exist in the default Ultrix configuration. These locations may be different under SunOS or other operating systems.

A nameserver uses one table for resolving host name to network address queries, and another table of "reverse" mappings to resolve address-to-name queries. For reverse queries to operate correctly across the entire Internet, the NIC must be contacted to delegate authority to your site for the network in question.

#### 7.4.1. Forward Mappings

The forward mappings are used by the nameserver to resolve name-to-address queries. At UCSD, the following table is used for the `s2k.ucsd.edu` subdomain: [/usr/var/dss/namedb/hosts.db]:

```
;
; Forward Mappings for S2k.berkeley.edu
; Entries for heel and toe must be in the /etc/hosts file for
; this to work.
;

s2k.Berkeley.EDU.  IN  SOA  toe.CS.Berkeley.EDU.  forrest.cs.berkeley.edu.
        ( 920728                                        ; serial number
        36000                                           ; refresh every 10 hours
        1800                                            ; retry every 30 minutes
        360000                                          ; expire 4.2 days (100 hrs)
        86400 )                                         ; minimum TTL - 1day

s2k.Berkeley.EDU.    IN                 NS              toe.CS.Berkeley.EDU.
```

| | | | |
|---|---|---|---|
| | IN | NS | heel.CS.Berkeley.EDU. |
| $ORIGIN | | s2k.Berkeley.EDU. | |
| gw | IN | A | 192.150.186.1 |
| nobozo | IN | A | 192.150.186.2 |
| toe | IN | A | 192.150.186.3 |
| erewhon | IN | A | 192.150.186.4 |
| gaia | IN | A | 192.150.186.5 |
| stinson | IN | A | 192.150.186.6 |
| mickey | IN | A | 192.150.186.7 |
| chorizo | IN | A | 192.150.186.8 |
| heel | IN | A | 192.150.186.9 |
| bigdog | IN | A | 192.150.186.10 |
| jeff | IN | A | 192.150.186.11 |
| lsisim | IN | A | 192.150.186.12 |
| grayling | IN | A | 192.150.186.13 |
| covet | IN | A | 192.150.186.14 |
| forgery | IN | A | 192.150.186.15 |
| arcadia | IN | A | 192.150.186.16 |
| triplerock | IN | A | 192.150.186.17 |

This table contains the hosts in the `s2k.Berkeley.EDU` subdomain. Currently, the name of the host providing this information is `toe.CS.Berkeley.EDU`. The nameserver initialization file (usually `/usr/var/dss/namedb/named.boot`) file on `toe.CS.Berkeley.EDU` contains the line:

```
primary  s2K.Berkeley.EDU /usr/var/dss/namedb/hosts.s2k
```

which causes primary responsibility for this naming subdomain to be retrieved from the file `/usr/var/dss/namedb/hosts.s2k`.

### 7.4.2. Reverse Mappings

The nameserver reverse mapping tables provide the nameserver with information necessary to resolve an address-to-hostname query. For S2K at Berkeley, the following table is used [/usr/var/dss/namedb/s2k.rev]:

```
; ------------------------------------------------------------------
; Reverse Mappings for S2k.Berkeley.EDU
; ------------------------------------------------------------------
@       IN SOA toe.CS.Berkeley.EDU. forrest.cs.berkeley.edu.
        ( 920728                                ; serial number
        36000                                   ; refresh every 10 hours
        1800                                    ; retry every 30 minutes
        360000                                  ; expire 4.2 days (100 hrs)
        86400 )                                 ; minimum TTL - 1day

s2k.Berkeley.EDU    IN                          NS          toe.CS.Berkeley.EDU.
                    IN                          NS          heel.CS.Berkeley.EDU.

1       IN      PTR         gw.s2k.Berkeley.EDU.
2       IN      PTR         nobozo.s2k.Berkeley.EDU.
3       IN      PTR         toe.s2k.Berkeley.EDU.
4       IN      PTR         erewhon.s2k.Berkeley.EDU.
5       IN      PTR         gaia.s2k.Berkeley.EDU.
6       IN      PTR         stinson.s2k.Berkeley.EDU.
7       IN      PTR         mickey.s2k.Berkeley.EDU.
```

```
8       IN      PTR     chorizo.s2k.Berkeley.EDU.
9       IN      PTR     heel.s2k.Berkeley.EDU.
10      IN      PTR     bigdog.s2k.Berkeley.EDU.
11      IN      PTR     jeff.s2k.Berkeley.EDU.
12      IN      PTR     lsisim.s2k.Berkeley.EDU.
13      IN      PTR     grayling.s2k.Berkeley.EDU.
14      IN      PTR     covet.s2k.Berkeley.EDU.
15      IN      PTR     forgery.s2k.Berkeley.EDU.
16      IN      PTR     arcadia.s2k.Berkeley.EDU.
17      IN      PTR     triplerock.s2k.Berkeley.EDU.
```

To enable the reverse mappings, the `/usr/var/dss/namedb/named.boot` file contains the line:

```
primary  186.150.192.IN-ADDR.ARPA /usr/var/dss/namedb/s2k.rev
```

An important difference between the administration of forward and reverse mappings is the need to contact the NIC when establishing an authoritative table of reverse mappings. Machines requesting reverse name lookups for S2Knet machines will typically query a local nameserver for reverse entries, and upon failure revert back to a query to a root nameserver (e.g. at the NIC). If the NIC is not informed (i.e. by a human) of your desire to take over responsibility for a particular set of reverse mapping, the request will fail when it reaches the root nameserver which will be unable to resolve the reverse mapping request. To inform the NIC of your intent on establishing an authoritative nameserver for reverse mapping, obtain the file `nic.ddn.mil:netinfo/in-addr-template.txt` by public ftp, fill it out, and send it to `hostmaster@nic.ddn.mil`.

## 8. Addressing

Each interface on each host and router in the S2Knet receives its own network address. S2Knet has obtained a number of class C network numbers from the NIC and has allocated them as follows: [Note UCLA has a second network but not a first, and UCSD has no second]

| Sequoia 2000 Address Assignments | | |
|---|---|---|
| Network Name | Campus | Address Range |
| NET-SEQUOIA1 | All | 192.154.4.0 |
| NET-SEQUOIA2 | All | 192.154.5.0 |
| NET-SEQUOIA3 | All | 192.154.6.0 |
| SDSC-SEQUOIA | SDSC | 198.17.101.0 |
| UCB-SEQUOIA1 | Berkeley | 192.150.186.0 |
| UCB-SEQUOIA2 | Berkeley | 192.150.187.0 |
| UCLA-SEQUOIA2 | UCLA | 192.154.2.0 |
| UCSB-SEQUOIA1 | UCSB | 192.150.216.0 |
| UCSB-SEQUOIA2 | UCSB | 192.150.217.0 |
| UCSD-SEQUOIA1 | UCSD | 192.154.1.0 |
| UCSD-SEQUOIA2 | UCSD | 198.17.198.0 |

Table 3

### 8.1. Subnets and Broadcast Addresses

The subnet structure and choice of subnet mask at each campus is decentralized. The default subnet mask of `255.255.255.0` allows one network of 255 hosts. Broadcast addresses will be assigned with all 1's in the host field, except where local practice requires all 0's.

### 8.2. Interface Addresses

FDDI interfaces are assigned addresses from the campus-allocated class C S2Knet address space listed in Table 2. Ethernet interfaces are assigned addresses from the already-existing subnet structures at each site. For example, the Ethernet interfaces on S2Knet machines at Berkeley would use addresses from the 128.32 class B address space, and at UCSD would use addresses from the 132.239 class B network.

## 9. Routing

Routing table information is exchanged between the S2Knet routers via the RIP protocol. Each router runs the *gated* program as a routing daemon to control routing information exchange. Gated provides a much finer granularity of control over routing information exchange than most vendor-supplied programs (e.g. *routed*). Gated version 2.1 also provides support for several routing protocols, including HELLO, RIP, EGP, and BGP Version 1. The *gated* program may be obtained via public FTP at `gated.cornell.edu:/pub/gated/gated-2.1.tar.Z` You should also retrieve and apply any patches stored in this directory. The README file in the directory explains additional information. Note there is also another version of *gated* called *gated-alpha* which ostensibly supports OSPF as well.

In an effort to maintain fallback routing to S2Knet machines during periods of S2Knet backbone outages, S2Knet Class C networks will be advertised to the NSFNET Regionals via the routing protocol chosen by the local NSFNET management. Metrics are chosen in such as way that S2Knet hosts will preferentially choose routing via the S2Knet backbone to communicate with remote S2Knet hosts. During S2Knet backbone outages, routing will change in such a way as to prefer NSFNET routing. At no time are routes *through* the S2Knet backbone to be advertised to the NSFNET Regionals.

Each Sequoia router must have a gated configuration file. Here is a sample /etc/gated.conf file for one of the S2Knet routers:

```
#
# Gated configuration file for UCSB Router (links to UCB and SDSC)
#
# BREEZE.UCSB.EDU
#
# Kevin Fall
# June, 1992
# kfall@ucsd.edu
#

tracefile               "/usr/tmp/gated.trace"          replace;
traceoptions            mark nostamp;
interface               all             passive;
#autonomoussystem xxx

#
# Global protocol descriptions
#                       Supported Routing Protocols
#                       For now, using only RIP, and not advertising on ln0
#

hello off;
bgp off;
egp off;
redirect off;

rip yes {
```

```
                preference   35;
                defaultmetric                 1;
                interface    ln0              noripout;
};

#
# Static Routes
#

# default gateway
static {
                default      gateway          olive-fddi.s2k.ucsb.edupreference70;
};

#
# Route Acceptances
#

accept proto rip {
                nolisten     default;
                listen                        all;
};

#
# Route Advertisements
#

# Announcements on the UCSB s2k net
propagate proto rip interface fza0 {
                proto rip {
                        announce          ucb-s2k1;
                        announce          ucb-s2k2;
                        announce          ucsd-s2k1;
                        announce          sequoia1 mask 255.255.255.0 ;
                };

                proto direct {
                        announce          ucb-s2k1;
                        announce          ucb-s2k2;
                        announce          ucsd-s2k1;
                        announce          sequoia1 mask 255.255.255.0 ;
                };
};

# Announcements on the UCSB<->UCB link
propagate proto rip interface ds0 {
                proto rip {
                        announce          ucsb-s2k1;
                        announce          ucsb-s2k2;
                        announce          ucsd-s2k1;
                        announce          ucla-s2k2;
                        announce          sequoia1 mask 255.255.255.0 ;
                };
```

```
                proto direct {
                        announce        ucsb-s2k1;
                        announce        ucsb-s2k2;
                        announce        ucsd-s2k1;
                        announce        ucla-s2k2;
                        announce        sequoia1 mask 255.255.255.0 ;
                };
};

# Announcements on the UCSB<->SDSC link
propagate proto rip interface ds1 {
                proto rip {
                        announce        ucb-s2k1;
                        announce        ucb-s2k2;
                        announce        ucsb-s2k1;
                        announce        ucsb-s2k2;
                        announce        ucla-s2k2;
                        announce        sequoia1 mask 255.255.255.0 ;
                };

                proto direct {
                        announce        ucb-s2k1;
                        announce        ucb-s2k2;
                        announce        ucsb-s2k1;
                        announce        ucsb-s2k2;
                        announce        ucla-s2k2;
                        announce        sequoia1 mask 255.255.255.0 ;
                };
};
```

## 10. Testing Boggs' T1 Cards

Since S2Knet relies so completely on Dave Boggs' Turbochannel T1 boards, a procedure for testing them is very important. What follows is a mail message from Dave in which he describes a test procedure.

> (Message seq:168)
> To: ewa@cs.ucsd.edu
> Cc: boggs@Pa.dec.com, sequoia-netops@postgres.berkeley.edu
> Subject: Re: TurboChannel T1 adapters
> Date: Mon, 23 Mar 92 15:51:46 PST
> From: David Boggs <boggs@pa.dec.com>
>
> Pick a link (e.g. breeze to redwood).
> Halt Unix at both ends.
> Check the cables from CSU to adapter:
> net-to-adapter on 1&2,
> adapter-to-net on 4&5.
> Test the T1 adapters. For each adapter:
> Start the on-board diagnostic
> set "loopback" program variable (TX looped into RX)
> run "test" and verify that the adapter can talk to itself.
> For each adapter, test the adapter-to-CSU path:
> loopback the CSU toward the adapter
> set "clock" program variable (TX clock from local oscillator)
> clear "loopback" program variable (TX & RX connected to T1 line)
> run "test" and verify that the adapter can talk to itself via the CSU.
> I ASSUME SOMEBODY HAS VERIFIED THAT THE TWO CSUs CAN TALK TO EACH OTHER.
> At redwood:
> clear the CSU loopback
> set "clock" program variable (TX clock from local oscillator)
> clear the "loopback" program variable
> run "rxtest"
> On breeze:
> clear the CSU loopback
> set "clock" program variable (TX clock from local oscillator)
> clear the "loopback" program variable
> run "txtest"
> If everything is working, redwood will print a string of "!!!!!!!"s
> Otherwise, the receiver should print bad status messages and/or
> data compare error messages.
> On redwood, stop txtest by typing a space, note number of pkts xmitted.
> On breeze, stop rxtest by typing a space, note number of pkts rcvd.
> The number of packets transmitted and received should be about the same
> (e.g. 10005 vs 10003).
> Reverse the test:
> run rxtest on breeze
> run txtest on redwood
> Start the receiver test first.
>
> If you encounter problems:
> At one end:
> clear loopback
> set clock
> (transmitter is idle sending continuous flags)

At the other end:
run "watch" command (print out anything received)
nothing should print out because the link is idle and should be
filled with HDLC flags.
if anything prints out, the T1 circuit is screwing you,
and the shape of the screw is the data being printed.

Next, a full test:
clear "loopback" program variable on both ends.
run "echo" on one end.
run "test" on the other end.

/David Boggs

## 11. Contacts

This section lists human contacts for the S2Knet. Everyone associated with the S2Knet should be listed here. Name, postal address, email address, phone number, fax number, and relationship/responsibility to the S2Knet.

### 11.1. S2Knet Manager

Jon Forrest
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forrest@cs.Berkeley.EDU

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(619) 534-1149 voicemail
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kfall@ucsd.edu

*Troubleshooter:*
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### 11.3. Berkeley

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### 11.7. SDSC

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### 11.8. UCOP

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issdls@uccvma.ucop.edu

*Alternate:*
[TO BE DETERMINED]

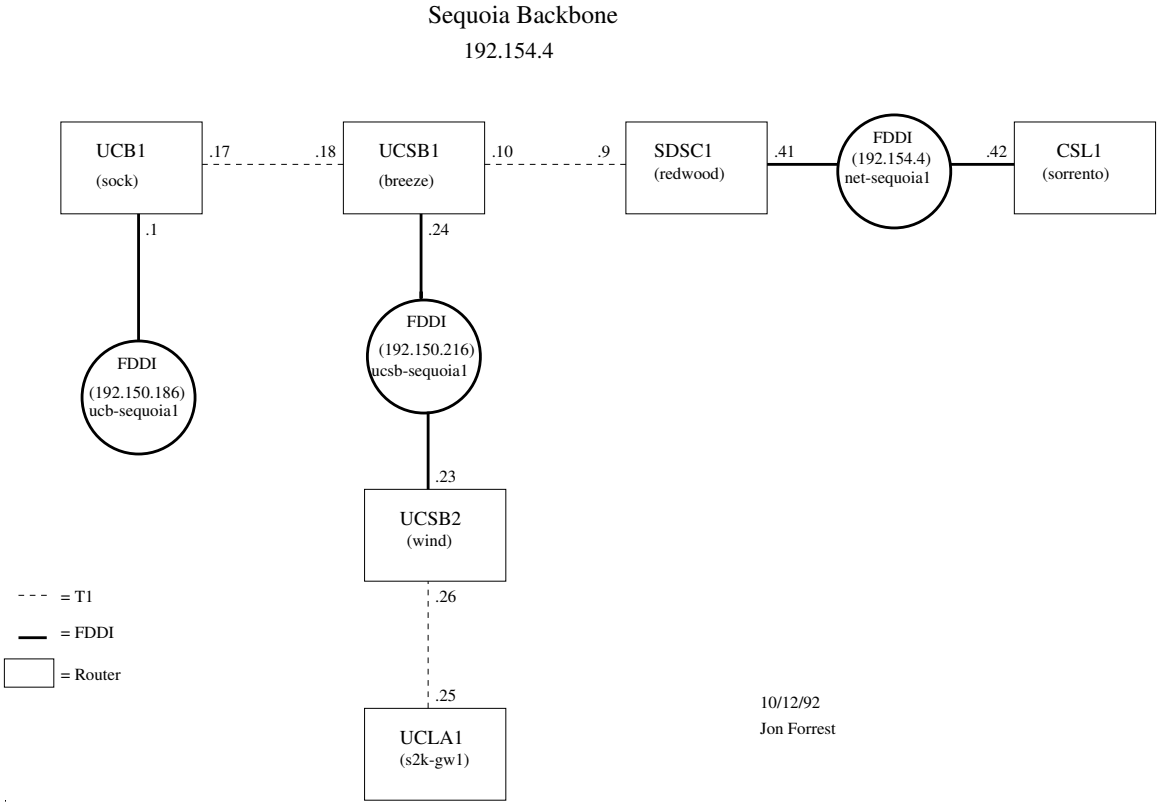
### 11.9. Full Contact List

[NEEDS TO BE FILLED IN WITH CONTACT INFO FOR EVERYONE LISTED ON FRONT PAGE]

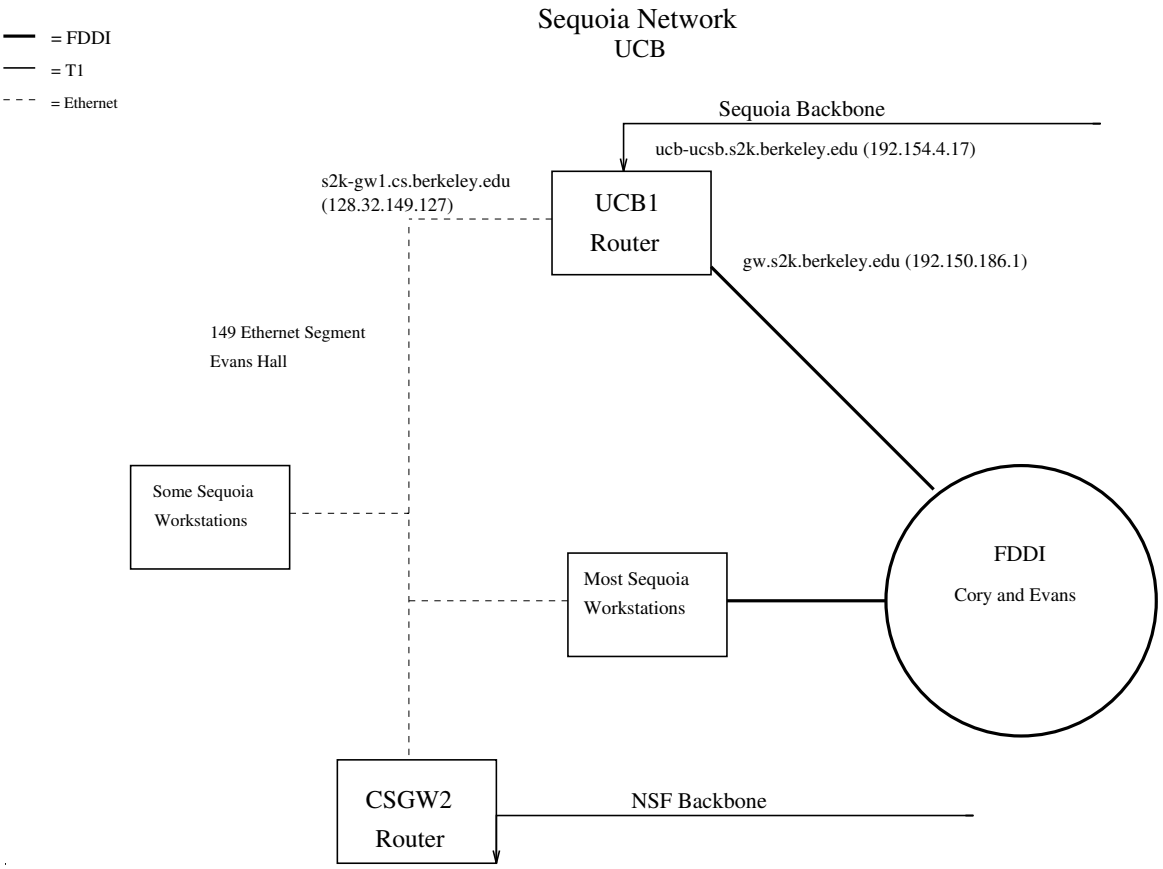
## 12. Network Maps

The following are maps showing the configuration of the S2Knet backbone and of the various S2Knet sites.

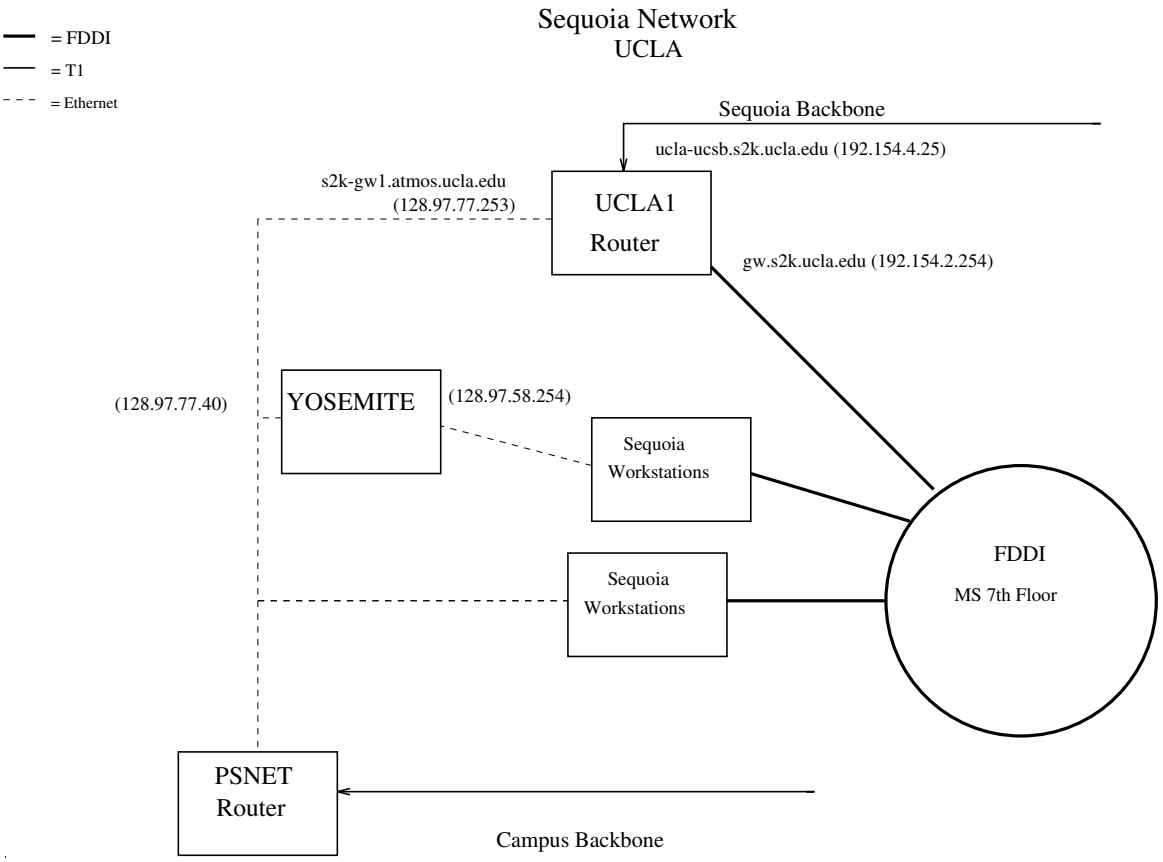
### 12.1. Seqouia Backbone



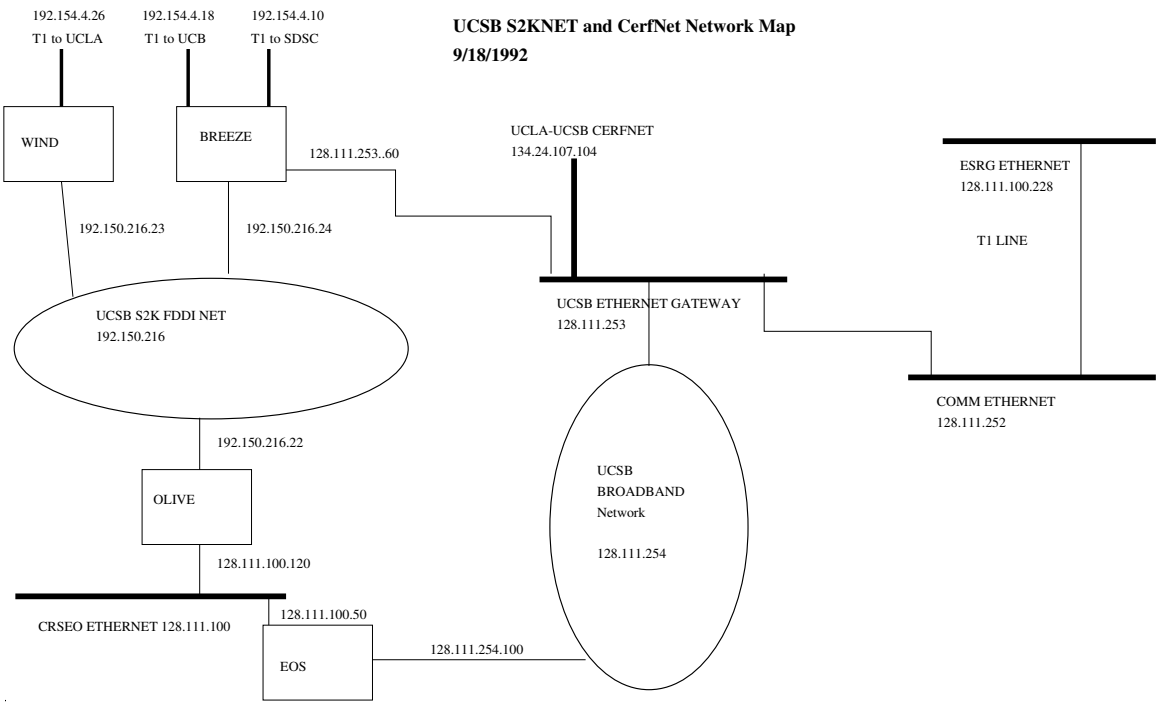
## 12.2. UC Berkeley



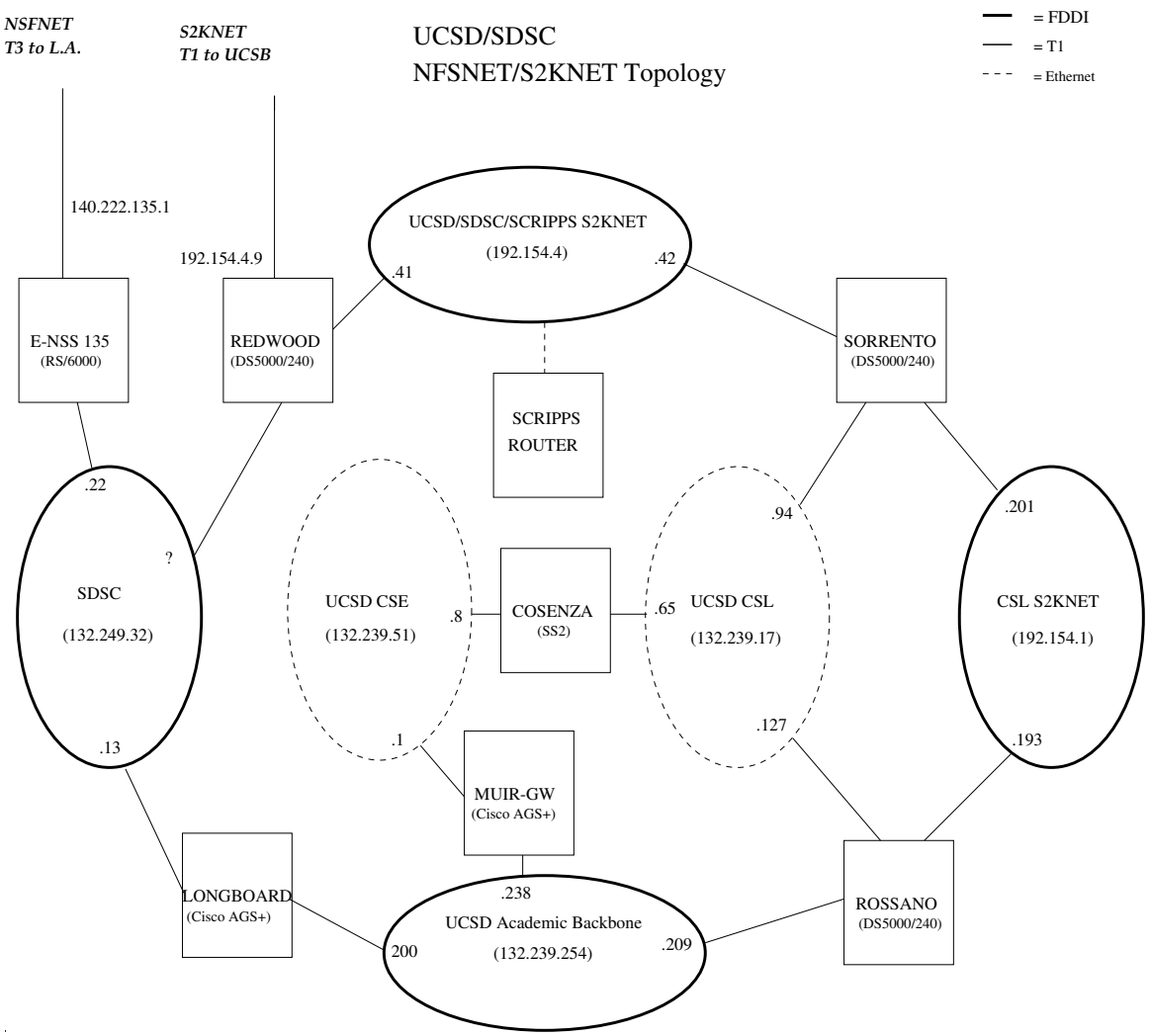
### 12.3. UC Los Angeles



## 12.4. UC Santa Barbara



## 12.5. UC San Diego



**Sequoia 2000 Network (S2Knet) Handbook**


Introduction ..... 1
Definitions ..... 1
Policies ..... 2
Topologies ..... 3
Physical Connections ..... 4
Naming ..... 4
Addressing ..... 8
Routing ..... 9
Testing Boggs' T1 Cards ..... 12
Contacts ..... 14
Network Maps ..... 17