Cafe Violeta 893-0662 -2572

Magnet # → 849-2573

COMMUNITY MEMORY SITE SURVEY

Site name La Peña Site addr. 3105 Shattuck Phone: 849-2568

Site Contact person(s) Paul Chin Pos./title: Cultural Worker collective Secretary Treasurer

Hrs. avail. 10-6 PM How long at site? 1976

# of staff 5½ payed duties Programming, community contacts, staffing cultural room

---

Physical site

Approx. size of area Make space as needed Table provided (Y/N) ✓ Height normal

Chair provided ✓ Lighting ____ Elec. Out. ✓ Noise ____

Visib. to staff ✓ Would printer create problems (noise/space) X

General impression (nice, right, wrong, etc.) great

Storefront space for a CM sign? ✓ Other advertising? ____

Demographics of neighborhood ____

Demographics of clientele street people, Latino, radicals

# of people/day 10-200 ~50 repeaters 65-70% first timers ___ locals ___ out of town ___

How might current clients use CM? (what databases would develop? how fast?): ___

events, ~~of~~ Latin America, Street people services

How might CM attract new clients to site? people need referrals for Spanish services

Does prospect know of other sites with complimentary info. needs (and why): ___

~~Data Center~~ Data Center

Funding possibilities (Check approp. space and elaborate in Int. observ. below)

Clients (fee for service): ____ Sponsors (share of financial benefits): ____

Donors (help with funding): No $ for phone install.: ____ mo. chrgs.: ___

in red

(Over for Page 2.)

Interviewer Observations

Attitudes/expectations re CM at end of interview: He thought it was "a great idea" & seemed real interested

contact person(s) Paul Chin

staff

Process of approval for using site: Collective process

How long will it take to get approval ~week

Staff training (what times would be good?) ~~[illegible]~~ - during day

Is there a bulletin board on the site? Yes What kind of information exchange goes on at site in the opinion of people on site?

events, spanish referals

In your opinion?

Interview completed by: Philip Kahn Date: 1-12-84

OTHER COMMENTS:

Their Concerns

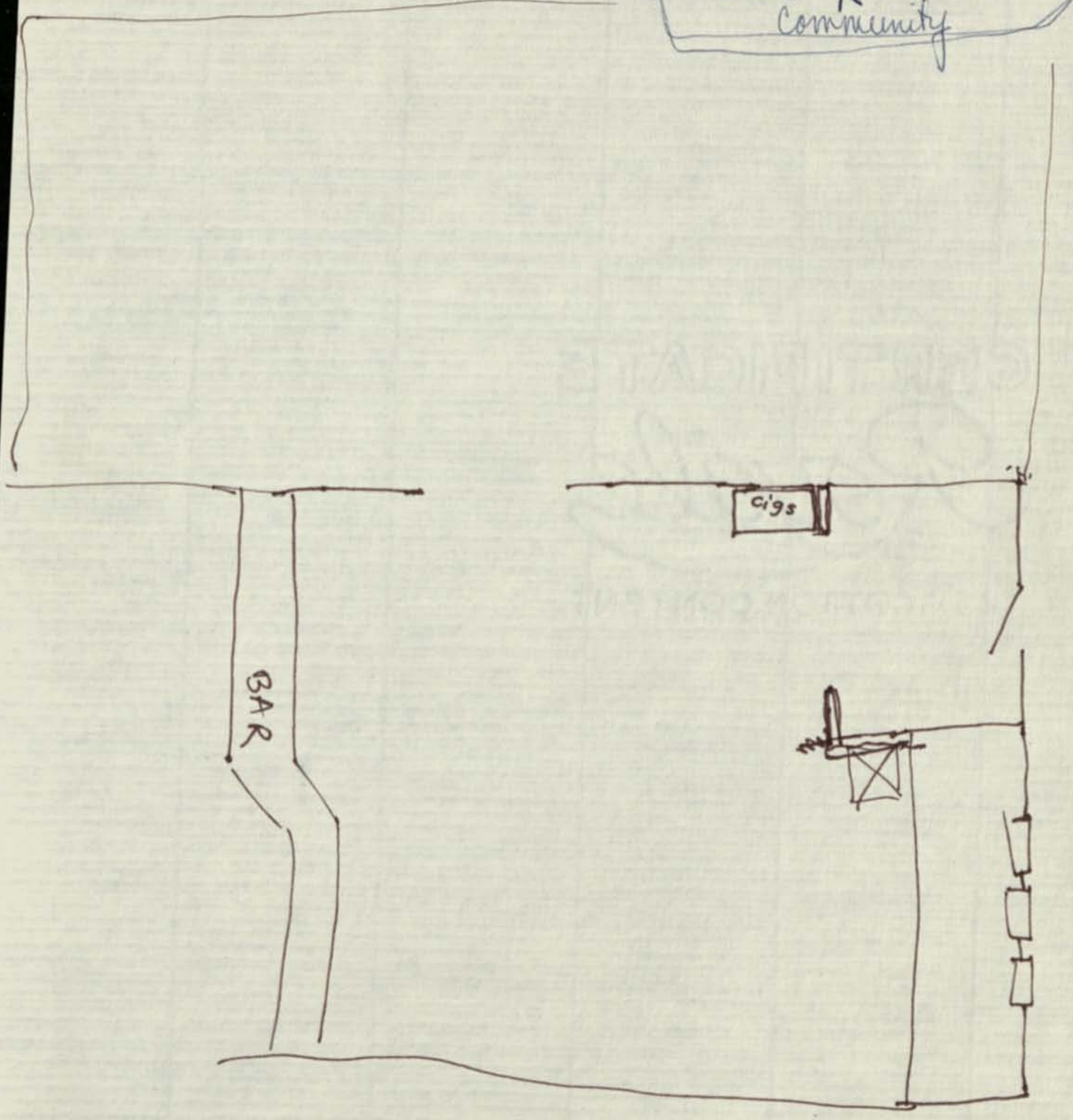
① rip off - liability
② staff time needed?
(③ electric bill)

My Concerns

① security — no alarm, big windows, many keys. (Paul says they haven't been broken into yet)

Must have spanish version

LaPena - Staff meeting
7:30-10:30 on Monday 1
Cardelus room
Community



CONTACT LOG

Hours Available 10-6

June 3 — Lisa from phone company said LaPena to be installed next week June 10 – June 15 in the afternoon called Paul Chin and told him. E.

June 11 — Left msg for Paul Chin re: picking up table from

6-19 — Left msg for anyone to call Carl @ CM (about scheduling phone installation tomorrow 9AM) Roberto called back, said after 10 would be okay.

6/19 — Talked to Paul Chin, re phone installation. Scheduled for 6/21, 11 pm.

6/27 — Tested line to 2400 Baud with Hy-powered line doctor

7/17 — Tere called Paul Chin "OK for us to come on over and bring the terminal up?" "Sure" off we go. Came on-line @ 5:30. Combination for table lock is 418. Tentatively scheduled a class for people there on Wed 8/1 during the day.

8/7 — **Carl called + arranged to re-wire the terminal between 4+5 (so we can reverse black + yellow leads on this end for consistency).** Went out + fixed cabling. We had to put in an extra, unexplained cross -- see CM log for 8/7. ~~Holiday~~ Next time we're out, we should undo the extra cross at that end + move it back here where we can get at it.

1/5/88
- REMOVED TERMINAL UPON COLLECTIVE'S REQUEST
- PAUL CHIN SAID THEY WERE OPEN TO HAVING A NEW TERMINAL ON THEIR PREMISES.
- WE SHOULD MAKE A PITCH TO THE COLLECTIVE. THEY MEET EVERY MONDAY AFTERNOON.

- ROBERTO COMPLETES CALENDAR BY 10th of the PRIOR MONTH

- HE WILL BRING SEPTEMBER'S CALENDAR TO SM.

  WE WILL ① FORMAT IT IN WORD
  ② SEND IT TO OUR 386

EMAIL REPORT #4 7/21/98

COMPUTER WHIZ.

GROUP: LA PEÑA PHONE: 849 2573

CONTACT: ROBERTO JOHANSSON ← SPOKE W/ 8/10/88
PAUL CHIN

ADDRESS: 3105 SHATTUCK AVE
B. 94705

— HAVE MAC &
— MODEM

FUNCTION OF ORGANIZATION:

- PRESS RELEASE + CALENDAR

MEMBERSHIP IS COMPRIZED OF:

OPEN MEETINGS HELD? Y/N WHAT DAY?

PUBLISH A ~~NEWSLETTER~~ CALENDAR? (Y/N) HOW OFTEN? MONTHLY

OWN A COMPUTER? (Y/N) WHAT KIND? MAC

OWN A MODEM? (Y/N)

FAMILIAR W/ CM? (Y/N)

USED CM? (Y/N) PERSONALLY / FOR ORGANIZATION? (Y)

GET CM NEWSLETTER? Y/N

IMMPRESSIONS OF CM: THEY THINK ITS WONDERFUL AND ARE ALL FOR PUTING THEIR CALENDAR ON LINE.

OTHER REMARKS / COMMENTS:

Conversation w/ Todd 9/28/90

- he's taking disks; he has backup of latest database
- Thoreau is using machine next week, but he'll call me and arrange a time to clean out hard disk. (I should call him mid-week if I haven't heard).
- Heidi allegedly has a bill from us. Todd will check it out + get us our 2nd $1000.
- After machine is moved + back on net:
  - get someone to verify FTP, set up Ultrix account
  - get diskettes from Todd; arrange time on PS/2 w/ Gib; FTP stuff to Ultrix
  - do compiles + install

Somebody to port to vax UNIX

Pat Lathrop 338-1909 works for John True

Todd Erikson

SFSU wants to port Interact on a DEC machine running ULTRIX ~5 weeks

Pat Lathrop ($1200 negotiable)

Talk to board on 7/17

Image bridge -- people from PEN -- CM presence?

Fri. eve.
International Cafe - Haight

Did 2nd check ever come?

Gib Robinson 863-2453

has grant from Hewlitt Foundation

support community orgs. involved w/ homelessness

wants to bring up multi-campus BBS + e-mail

eventually large databases

procomm on 386

321 Page St.
SF 94102

Lab @ SFSU
338-1157

~~Veronica~~

Carl Hills
5/1 → Gib Robinson
863-2453
after 3:00 till -6:30

re: ?'s about electronic mail

① e-mail ← use unix email
② security
  ① open to everyone
  ② open only to sub-groups
  OK if separate database

Set it up + send bill. They'll try to pay it. Have grant from Hewlitt Foundation, but it doesn't pay whole thing.

Short Cut #2 - Menu Buttons

You can use the FIND, INDEX, ADD, and EXIT buttons instead of the menu selections on the MAIN SCREEN.

Interact mail error:

logged in /usr/spool/mqueue/log

↑ SMTP entries?

From uucp Wed Apr 11 02:37 PST 1990
>From uunet.uu.net!sutro.SFSU.EDU!eps Wed Apr 11 01:44:11 1990 remote from unisoft
Received: from sutro.sfsu.edu by uunet.uu.net (5.61/1.14) with SMTP
        id AA21651; Wed, 11 Apr 90 02:36:44 -0400
Received: by sutro.SFSU.EDU (NeXT-1.0 (From Sendmail 5.52)/NeXT-1.0)
        id AA05080; Tue, 10 Apr 90 23:36:14 PDT
Date: Tue, 10 Apr 90 23:36:14 PDT
From: uunet.uu.net!sutro.SFSU.EDU!eps (Eric P. Scott)
Message-Id: <9004110636.AA05080@sutro.SFSU.EDU>
To: unisoft.com!carl@commem
Subject: Re: More networking questions
Status: R

>I had a second question for you (actually the one for which John Loiacono
>(first gave me your name). We're using NCSA telnet to access our server
>from PS/2's in various labs. The procedure now is to boot with a special
>NCSA telnet diskette which establishes the initial connection, and then
>type in a login name of "interact". Is it possible to get NCSA telnet to
>supply the login name automatically (i.e. to run a pre-specified chat
>script on making a connection)?

The next release from Clarkson (now named CUTCP/CUTE) will
support rlogin, so you could set it up to use a specific login
name. There is no general "chat script" capability.

If AIX works like most other UNIX systems a "better" solution may
be available: move telnetd to a different port and provide
"direct" interact service on port 23. This has several other
beneficial effects: each session only takes one process slot
instead of the current 2 or 3, so you have less context
switching, lower memory usage, and thus the ability to support
more concurrent users. Disadvantage: may involve messy coding,
since you'd have to implement telnet protocol.

>Also, before I send in the uucp map entry, (see below) what is cshub?

cshub is SFSU's only current UUCP site. Its entire purpose is to
handle e-mail, no one (normally) logs into it. Some uucp systems
send all *.sfsu.edu mail here.

>Do we have some sort of automatic knowledge of it through SMTP or
>something?

It's on the Internet as cs.sfsu.edu.

>   Should it be in my Systems file?

No. You won't be using uucp for mail delivery, and a listing in
Systems implies other functionality besides mail.

>   (I've never dealt with
>BSD-based mail, so administering the internet side of all this is a bit
>new to me).

It's not that bad (assuming IBM didn't do anything too stupid to
it). If people can send e-mail to suggestions@interact.sfsu.edu
and something more or less rational happens, you've met the basic
goal. If you want to get more involved you could set up interact
as an MX forwarder for commem. (How "permanent" is the machine?
I understand that it's a loan.) Someone may come up with
brilliant ideas in the future that depend on mail working
properly, so you might as well take care of it early on.

Before sending in a map entry, edit the 6W line to be your id
and the current date and time

-=EPS=-

P.S. This is a little off-the-wall, but bear with me. SFSU is
going to install a dedicated T-1 circuit to UC Berkeley in a
few months. Half of it is turning into phone lines, half of it
is up for grabs. Would you be able to make use of a dedicated
56Kb circuit to the SFSU campus, perhaps in the form of an
Internet connection? (No promises, this is just something a
proposal could be written for; we're paying for the T-1 whether
we use it to capacity or not.)

Amiga ATalk (vt100)

login: cmoper – saw login msgs, but couldn't type.

at home, garbage on screen

IBM-PC PCTalk (vt100)

login: inferact procomm

no response

several enter keys

return to login

Robin Assali] Thurs - 11am

389-8141

Off-campus:

1st contact thru academic computing advisory board

① Share info about homeless — several campuses cooperating (incl. Stanford?)
want to demo to off-campus offices
got $150,000 -- charge?

② Journalism -- CSU system-wide newswire
over CSU-Net

```
From uucp Thu Apr  5 10:37 PST 1990
>From unnet!uu.net!sutro.SFSU.EDU!eps Wed Apr  4 16:21:56 1990 remote from unisoft
Received: from sutro.sfsu.edu by uunet.uu.net (5.61/1.14) with SMTP
        id AA29148; Wed, 4 Apr 90 18:01:49 -0400
Received: by sutro.SFSU.EDU (NeXT-1.0 (From Sendmail 5.52)/NeXT-1.0)
        id AA00984; Wed, 4 Apr 90 15:01:19 PDT
Date: Wed, 4 Apr 90 15:01:19 PDT
From: unnet!uu.net!sutro.SFSU.EDU!eps (Eric P. Scott)
Message-Id: <9004042201.AA00984@sutro.SFSU.EDU>
To: unisoft!carl@commem
Subject: Re: uucp/telnet advice
Status: RO

>I got your name from John Liacano (sp?).  I'm working with a group on
                                Loiacono (I have trouble with it too)
>campus called Interact, which is setting up a campus-wide computer
>bulletin board.  The software runs on a server on your TCP network.
>For maintenance reasons, it would be convenient if we had a UUCP
>connection between our machine here in Berkeley (not on the internet)
>and our server on your network.  I've got things to where my machine
>can dial in, hook up to telnet, and log into the server, but uucp
>won't run, probably because of some telnet option.  Can you give me
>any advice on this?  You can reach me at 841-1114.

I'm sending this electronically because I don't expect you to be
able to transcribe it over the phone.

First of all, you aren't telling me whether you're calling our
telnet service, or whether you're using something in Berkeley.

Getting uucp to work over telnet is tricky at best, since g
protocol wants an 8-bit clean connection.  If you were using
our Bridge CS/200, your chat script would look something like:

interact Any ACU 2400 3382400 "" \r\c ass-\r\c-ass in \007 \r\c
        net)-\r\c-net) set\sia=boff ) c\sinteract\seom ) set\snas=unul
        ) set\sfot=n ) set\sfof=n ) set\sxb=on ) set\sdia=slb
        ) set\slbra=1 ) set\seomc=d ) res ogin: nuucp\n\c word: password\n\c

(Courtesy Wetware Diversions; folded for e-mail)
If you're dialing in through someplace else, you'll have to work
with them to figure out what's needed.

Note that we insist that all SFSU uucp sites be registered;
you can start with this (the name "interact" isn't taken),
tweak as needed and mail to apple!noa-maps

#N      interact
#S      IBM-PS/2 Model 80; AIX 1.1
#O      San Francisco State University / InterAct
#C      Carl Farrington
#E      commem!carl
#T      +1 415 841 1114
#P      1600 Holloway Avenue, San Francisco, CA  94132
#L      37 43 20 N / 122 28 28 W
#R      This is also interact.sfsu.edu [130.212.20.10] on the Internet
#U
#W      ziploc!eps (Eric P. Scott); Wed Apr  4 14:54:36 PDT 1990
#
interact=       interact.sfsu.edu
interact        commem(POLLED), oshub(LOCAL)
```

-=EPS=-

Diskettes:

1. ~~Set up to autoexec telnet program~~
2. supply login name automatically?
3. ~~TCP address assignments?~~ (for lab machines)
4. ~~Name server~~
5. Non-NCSA diskettes — Macs / Old 3com hardware / ??? — Which telnet? Problems?

need telnet option settings?

UUCP:

1. Dial-in? ~~(also non-uucp dial in from off campus)~~
2. Dial-out?

Eric P. Scott EPS @ sutro.sfsu.edu
338-1008
Todd will send e-mail

LABS
2425
6163
2169

[illegible]

3/20/90
4:00

Carl

Todd Ericksen
626-3420
Please call at home.

338-7115
John ~~Liccardo~~ Loiacono

338-2285
Thoureau Lavell ←
Behavioral/Social Science
Computer lab
2nd floor

338-6175
Heidi

procomm
^LO

	norm	shift	
F1	q	P	PF1
2	r	Q	2
3	s	R	3
4	t	S	4
5	u	m	-
6	v	l	,
7	w	n	.
8	x	M	ENTER
9	y	Y	
10	p	Z	
11	S	$	no leak-in
12	m	%	

Alternatives:

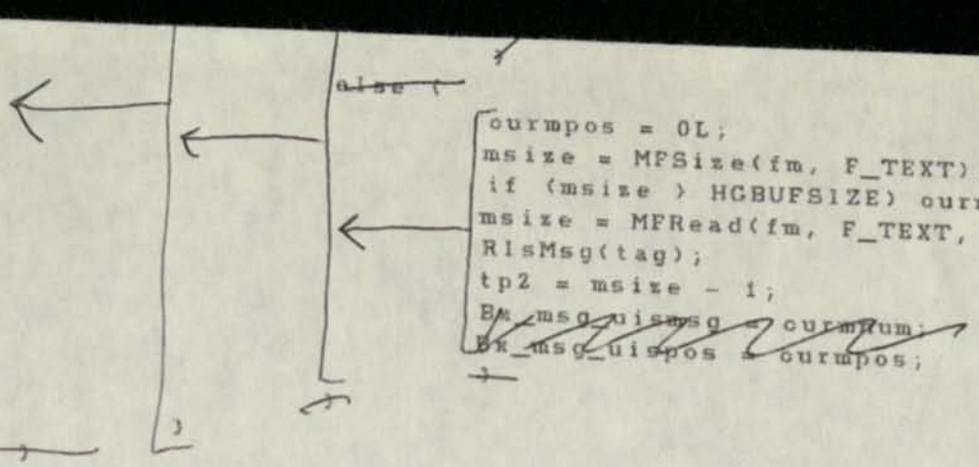
① rebuild / from tar tape on another file system, then dump + restore onto dk1

② reload dk1 from 3.12 release tape, then fix up from tar

③ start with existing dk1 + fix up from tar

unload everyth
or everything chan
since release

4 1019
4 u 1076
shd be 1005



```
                    curmpos = 0L;
                    msize = MFSize(fm, F_TEXT);
                    if (msize > HGBUFSIZE) curmpos = msi
                    msize = MFRead(fm, F_TEXT, curmpos,
                    RlsMsg(tag);
                    tp2 = msize - 1;
                    Hx_msg_uismsg = curmnum;
                    Hx_msg_uispos = curmpos;
                    }
                }
        else {
                tlen = tp2 - tp1;
                if (tlen >= 1) {
                        tlen += 3;
                        tcnt = (tlen-1/colsize)+1; /* # cols it takes */
                        tlen = tcnt * colsize; /* full column width */
                        if (spacelft < tlen) {
                                numcrs--;
                                spacelft = wwidth - tlen;
                                }
                        else {
                                spacelft -= tlen;
                                }
                        if (spacelft < colsize) {
                                numcrs--;
                                spacelft = wwidth;
                                }
                        }
                tp2 = tp1 - 1;
                }
        }
Hx_msg_uismsg = curmnum;
Hx_msg_uispos = curmpos + tp1;
return(1);
}
```

Class Outline

Introduction to UNIX

- file system - hierarchical; files + directories
- processes - each like a separate machine; limited inter-communication
- users - name + password; own files + processes; home directory; super-user

Basic unix skills

- logging in
- running programs -- basics
  - program name + parameters
  - scripts
- checking mail
- ls + cd
- examining + editing files ?
- printing files
- backing up files
- bringing up + shutting down unix

CM skills

- cmoper - logging in
- CMUP/DOWN ~~status up, down, check~~
- mail
  - status check -- who
  - daily status; responses
- backups
  - preparing disks
  - making backups
- bug reports ~~[illegible]~~

operator's manual
- procedure format
- additional info
- revisions + tech notes

editing config files

later: expiring, load, dump

SOFTWARE: NCSA Telnet
VENDOR: Clarkson University
VERSION: 2.2D
FEATURES: telnet, ftp, rcp, rarp, bootp, capture, color
EMULATION: vt102, Tektronix 4014

HARDWARE: Zenith AT, EtherLink
DOS: Zenith 3.3

CONFIG.SYS:
```
shell = c:\command.com /e:256 /p
device = c:\dos\emm.sys
device = c:\3plus\eth.sys
device = c:\3plus\pro.sys 10 20 2
device = c:\3plus\buf.sys
device = c:\3plus\idp.sys
device = c:\3plus\spp.sys
device = c:\3plus\lgl.sys
device = c:\dos\ansi.sys
buffers = 6
files = 20
lastdrive = j
```

AUTOEXEC.BAT:
```
echo off
echo *** SFSU ALANet Workstation Startup --
version 1.10 c:\3plus\runminds mindspro mindsbuf
mindseth mindsidp mindsspp mindslgl
c:\3plus\nb 4
c:\3plus\minses
c:\3plus\msredir /s:2 /L:4
c:\3plus\setname $$3com$$
c:\3plus\prtsc
path=c:\dos;c:\3plus
prompt $p$g
c:\3plus\3l
```

RAM FREE: 466K

ANALYSIS

no support for EtherLink MC
no support for EtherLink II

only one telnet/ftp session

from	telnet	ftp
C:	yes	yes
E:	yes	no

Because of our current relationship with IBM, we have an unlimited site license for VM TCP/IP. The first thing I noticed about this product is that it comes on 16 floppy disk. All of the other products are on two disks or fewer. It turns out that this is just the distribution package, and that the actual installed product only requires 2 disks. Like the Stanford product, VM TCP/IP is loaded with features.

Since most of the features are mentioned in the Stanford review, I will spare you another description.

I must say that IBM has done an excellent job on keeping the size of their driver down. 478K is pretty close to a bare bones 3Plus configuration. Compare this with Stanford's product, weighing in at 406K!

With IBM moving head-first into the Unix world, we should see a great deal of attention paid to this products development. Let's not forget that having an on-site IBM Systems Engineer around to answer questions has its advantages as well.

SOFTWARE: SU-PC/IP
VENDOR: Stanford University
VERSION: 2.0
FEATURES: telnet, ftp, ping, finger, whois, mail-handler

HARDWARE: Zenith AT, EtherLink
DOS: Zenith 3.3

CONFIG.SYS:

```
shell = c:\command.com /e:256 /p
device = c:\dos\emm.sys
device = c:\3plus\eth.sys
device = c:\3plus\pro.sys 10 20 2
device = c:\3plus\buf.sys
device = c:\3plus\idp.sys
device = c:\3plus\spp.sys
device = c:\3plus\lgl.sys
device = c:\comm\sun\net3c501.exe
device = c:\dos\ansi.sys
buffers = 6
files = 20
lastdrive = j
```

AUTOEXEC.BAT:

```
echo off
echo *** SFSU ALANet Workstation Startup --
version 1.10
c:\3plus\runminds mindspro mindsbuf mindseth
mindsidp mindsspp mindslgl
c:\3plus\nb 4
c:\3plus\minses
c:\3plus\msredir /s:3 /L:4
c:\3plus\setname $$3com$$
c:\3plus\prtsc
path=c:\dos;c:\3plus;c:\batch
prompt $p$g
c:\3plus\3l
```

RAM FREE: 406K

ANALYSIS

support for EtherLink MC
support for Etherlink II

only one telnet/ftp session

from	telnet	ftp
C:	yes	yes
E:	yes	yes

This is 3Com's answer to the PC-based TCP/IP software craze. 3Com was too cheap to develop their own product, so they purchased Stanford University's PC-IP software, wrote a new 3Com compatible driver for it, and sold to the public for $1000.00 a pop. This $1000.00 price tag buys you a license for all PCs on your 3Plus network.

PCS/TCP offers only the most simple TCP/IP features: telnet and ftp. The main advantage is total compatibility with 3Plus networks. In fact, PCS/TCP allows users to transfer files (using ftp) from TCP/IP hosts directly to their 3Plus network drives. This is feature is not available with any of the other products being reviewed.

Another drawback to PCS/TCP is its inability to remap keyboards for specialized host access. Keyboard mapping is user friendly and saves time.

The PC must run full NetBios. This program takes up about 24K, and is one of the reasons PCS/TCP leaves you with so little RAM.

To summarize, PCS/TCP offers basic telnet and ftp services to the user, along with 3Plus compatibility. But it lacks many of the additional features we would like to see.

SOFTWARE: TCP/IP for VM
VENDOR: IBM
VERSION: 1.10
FEATURES: telnet, ftp, tftp, finger, mail-handler, cookie

HARDWARE: Zenith AT, EtherLink
DOS: Zenith 3.3

CONFIG.SYS:

```
shell = c:\command.com /e:256 /p
device = c:\3plus\eth.sys
device = c:\3plus\pro.sys 10 20 2
device = c:\3plus\buf.sys
device = c:\3plus\idp.sys
device = c:\3plus\spp.sys
device = c:\3plus\lgl.sys
device = c:\dos\ansi.sys
device = c:\comm\vmip\netdev.sys
buffers = 6
files = 20
lastdrive = j
```

AUTOEXEC.BAT:

```
echo off
echo *** SFSU ALANet Workstation Startup --
version 1.10
c:\3plus\runminds mindspro mindsbuf mindseth
mindsidp mindsspp mindslgl
c:\3plus\nb 4
c:\3plus\minses
c:\3plus\msredir /s:3 /L:4
c:\3plus\setname $$3com$$
c:\3plus\prtsc
path=c:\dos;c:\3plus;c:\batch
prompt $p$g
c:\3plus\3l
```

RAM FREE: 478K

ANALYSIS

support for EtherLink MC
support for EtherLink II

only one telnet/ftp session

from	telnet	ftp
C:	yes	yes
E:	yes	no

What a pig! Stanford's product leaves you with 406K RAM. Many of you will find this to be the biggest drawback of this software. What do you get for all that RAM, you ask? You get a whole bunch of features.

You get ping, that great little resource found on most Unix systems. Ping allows you to bounce a packet off a specific host. This can simply tell you if the host is alive, or give you a complex analysis of packet traffic between your PC and the host.

But wait, there's more... You also get finger and whois. Finger service lets you "finger" someone on the network. Let me explain. I can type *finger jliv@foghorn* and the host will tell me all sorts of useful information, like the last time jliv logged on to foghorn, jliv's real name, jliv's work phone, work schedule, etc. Whois service allows me to make queries to the Internet. If I type *whois stanford.edu*, the central computer on the Internet will tell me all about the Stanford University domain, and other information like who the Network Manager is and how to reach him/her. Stanford has built an internal whois system that provides information about almost everyone on campus. Pretty snappy, eh?

Perhaps the most interesting feature of this product is the Mail Handler. This product allows users to have "mail only" accounts on specified mail servers (usually Unix hosts). The user can send and receive mail through the mail server without ever logging on. Great for users who don't want to have anything to do with host systems, but like to use E-Mail.

ANALYSIS

support for EtherLink MC
no support for Etherlink II

multiple telnet/ftp sessions

from	telnet	ftp
C:	yes	yes
E:	yes	no

I just can't say enough about this product. NCSA Telnet is by far the most popular PC TCP/IP product on this campus. It has many features, including a good clean user-interface. NCSA is in the Public Domain, so most of you will find the price is right. The folks at Clarkson University have produced a wonderful product.

Like all products in this review, NCSA supports telnet and ftp. Unlike the other products, NCSA supports multiple telnet and ftp sessions.

NCSA supports rarp and bootp. All of the products under review must be configured with a unique IP address and other protocol information. The rarp and bootp services allow network managers to supply this information automatically to PCs when they first boot-up.

I cannot list all the features of NCSA in this document, but I will mention just one more. NCSA does not require a RAM resident packet driver. That is to say, there is no need to load anything in your CONFIG.SYS file. When you run NCSA it gets its configuration from a simple ASCII file. This means that when NCSA is not running, it takes up absolutely no RAM!

In spite of all these features, NCSA has a few drawbacks. First of all, there is no support for the EtherLink II, yet. As noted above, NCSA's ftp will not work on 3Plus network drives. The only product that will do this is PCS/TCP (see review).

Overall, NCSA is a fine product that offers many useful features. If you can wait for the next release, you will see support for the EtherLink II. As for the the 3Plus compatibility...

PC TCP/IP Software Evaluation Grid -- March 15, 1990

	PCS/TCP	SU-PC/IP	UM TCP	NCSA
RAM FREE	427K	406K	478K	466K
TELNET on C:	yes	yes	yes	yes
TELNET on E:	yes	yes	yes	yes
FTP on C:	yes	yes	yes	yes
FTP on E:	yes	no	no	no
EtherLink	yes	yes	yes	yes
EtherLink II	yes	yes	no	no
EterLink/MC	yes	yes	no	yes
EtherLink Plus	yes	no	no	no
Multiple Sessions	no	no	no	yes
PING	no	yes	no	no
WHOIS	no	yes	no	no
FINGER	no	yes	yes	no
Mail Handler	no	yes	yes	no
RARP	no	no	no	yes
BOOTP	no	no	no	yes
COST	$800.00	PD	$0.00	PD

SOFTWARE: PCS/TCP
VENDOR: 3Com
VERSION: 20000
FEATURES: telnet, ftp
EMULATION: vt100

HARDWARE: Zenith AT, EtherLink
DOS: Zenith 3.3

CONFIG.SYS:

```
shell = c:\command.com /e:256 /p
device= c:\dos\emm.sys
device = c:\3plus\pro.sys  10 2 2
device = c:\3plus\buf.sys
device = c:\comm\pcstcp\vec501.sys
device = c:\comm\pcstcp\ethvec.sys
device = c:\comm\pcstcp\inpvec.sys
device = c:\3plus\idp.sys
device = c:\3plus\spp.sys
device = c:\3plus\lgl.sys
device = c:\dos\ansi.sys
break = on
lastdrive = m
files = 20
buffers = 20
```

AUTOEXEC.BAT:

```
echo off
c:\3plus\runminds mindspro mindsbuf mindsvec
mindseth mindsinp mindsidp mindsspp mindslgl
c:\3plus\netbios
c:\3plus\minses12
c:\3plus\msredir /S:4 /z:4096
c:\3plus\setname $$3com$$
c:\3plus\prtsc
path=c:\dos;c:\3plus;
prompt $p$g
c:\3plus\3l.bat
```

RAM FREE: 427K

Tues 3/29 — dump 7 — left fe running

group to get states or send msg to all

assign terminal names

backup

weekly usage summary — wait on spec from Tidd

/usr/spool/uucp/.Log/Old-Log-1

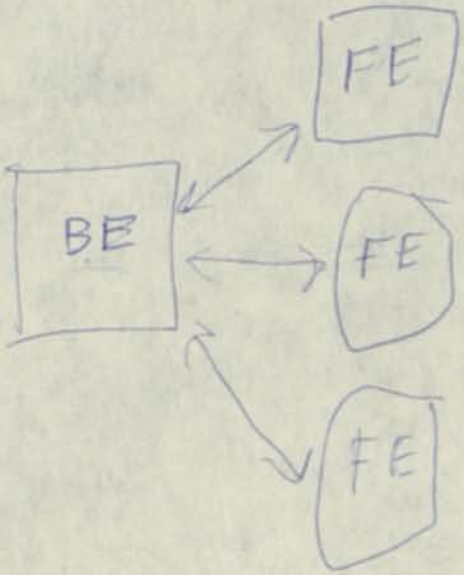
0329

Poll Packet logs -- turn off

help screen #s

script to generate → forum name config files

printer



338-2400

enter class: tn

c k interact

use 8-bit no parity

(worked w/ Procomm -- a bit noisy?)

Port selector : 338-2400

Class: X

PAD> C &. SWRL /80

TECNET> 130.212.20.10

Diskettes in AIX

① format new diskette:

```
format -v
```

② make a file system:

```
mkfs /dev/rfd0
```

③ mount it:

```
mount /dev/fd0  /diskette0
```

④ use it:

```
...  /diskette0 ...
```

← eg:
cd /u[interact
find :backups -print |
cpio -ov >/diskette0/backup.if

⑤ unmount it

```
umount /diskette0
```

/etc/hosts → (.rev .equiv)

/etc/net

changed internet address
& rebooted
added pty device

/bin/hostname SITE

John Liacano gave block to Lavell

130.212.20.xx ←——— .10 ← used for interact

(registration? etc.)

Lavell needs to get details on allocating address from Liacano before handing too many out.

NCSA - Telnet

Public Domain

PC Etherlink - MC + std (not EC-II)

Might be batch files on disk

13
16
19
15

d/14/84/82

10 20 212 130

getlock SHELL = /bin/Rsh

cat: cannot open tmp/fe4.ca.lock

getlock: tmp/fe4.ca tmp/fe4.ca.lock 1356

cmgr: All ports busy

pulled "\" out of getlock (before ".ca")
pulled sh stuff around echo
added code to cmgo to pull trace flags from tmp/feparms

opt: 44, 45, 49, 63

need: 48, 50, 55, 71, 70

1. ~~Install~~ ethernet card
2. ~~Move~~ source to diskettes
3. Make a remote diskette
4. get uucp running to CM (set up login, etc. beforehand)
5. ~~Set~~ up login script

use u_interact

cmoper *interact
root " "
cmlib (Marion)

AIX problems:

terminfo -- hft doesn't work unless insert/delete char removed

--

telnet logins -- ttyp's

hard disk mod?

Ungermann-Bass board or 3-com driver

fifos disallow O_RDWR

no getopts in shell

no %i in scanf

Recompilation environments

① set up to allow makes + file xfers remotely

② keep source compressed ? (modify makefile to uncompress + recompress)

③ script to pick up crc.lst, diff against main, make diff.lst, uucp file, make all

John Filson
IBM Aix expert
545-3887

Duncan
IBM/SFSU expert
545-3856 (lv msg)

SFSU

- ~~Keep~~ source online + compressed
- ~~Different~~ usr-id
- ~~Agreement from Todd~~ — keep on
  no distri
  prevent u
  inform us

cmlib
&*() uiop

root - % interact
cmoper - * interact

600 CLEVELAND AVENUE ALBANY, CALIFORNIA 94710 (415) 525-3401

getopts

~~batchload~~	1	← re-port
cmgo	2	
databack	2 (1)	
expire	2	
logpack	1	
logprep	1 (1)	
summary	9 (2)	

~~expire~~
~~preview~~
~~protect~~

~~kdump~~: Klid 1 too large

Unknown flag '-' (compress)

logprep: can't find directory /tmp/sumdir.3877

3890

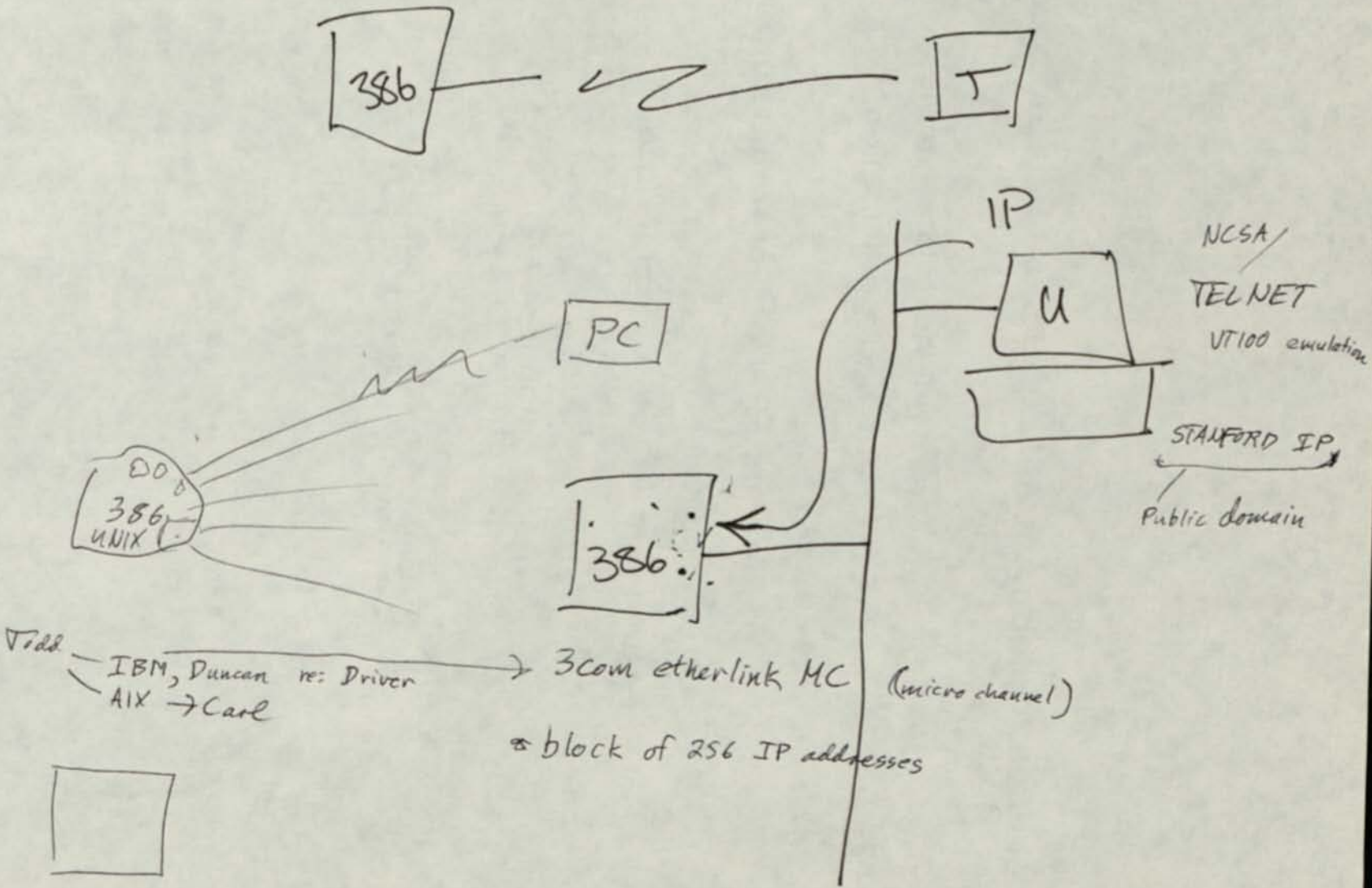
compress

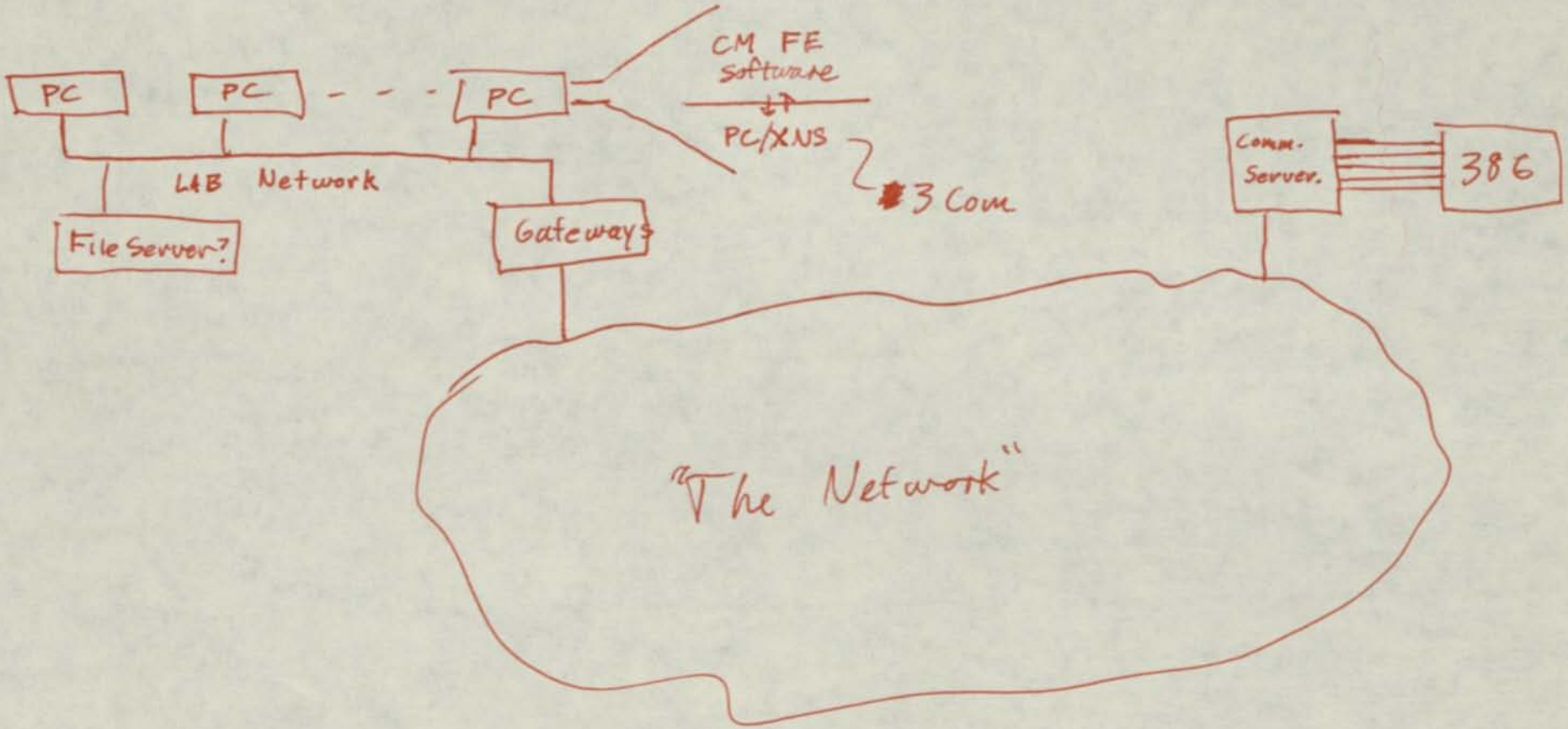
3rd party TCP/IP:

Streamlined Networks
P.O. Box 14763 Fremont, CA 94539
(415) 659-1450

John Loiacono
338-7115
} ask about
3com AIX driver
PC/TCP intercept of serial I/O

Also check on 3rd party drivers




PC
PC
PC
CM FE
software
PC/XNS
3 Com
L4B Network
File Server?
Gateways
Comm. Server.
386
"The Network"

From uucp Wed Jan 17 12:37 PST 1990
>From jswan Wed Jan 17 12:12 PST 1990 remote from cdp
To: ofarrington
Subject: Agenda for 1-19-90
Cc: jswan
Status: R

Hello Carl,
Below is a proposed agenda for the meeting on Friday. This isn't the word but these are the issues we need to be sure are being taken care of. Your techno novice, Jennifer

Agenda For InterAct 386 CFogNet connection meeting

1-19-90

Humanities rm 383

19th + Holloway

The following issues as well as related topics will be discussed. Thank you for your input and participation.

- Technical timelines

- installing IMB PSII 386 on FogNet from Humanities computer lab
  - Micro Channel
  - A AIX operating system
  - serial port vs. ethernet connections

--access to InterAct
  - boot-up process ← specific diskette -- boot up
  - Keyboard variations
  - dial-up from home

--maintenance issues
  - FogNet
  - Community Memory

Michael Donahue 338-1584

In charge of putting 386 on network

$345/serial port

5/10/89:

Said that LANs all have PCS/XNS, which intercepts BIOS interrupt 14 to allow serial port programs to run over LAN.

- We would need to modify our serial drivers to go through the BIOS rather than accessing the chip directly.
- Maybe we should do this anyway + write our own INT 14 TSR intercept to do input interrupt handling + buffering?

SFSU terminals:

if we go with dumb terminals, we need:

Function keys F1 - F3

Arrow keys

Backspace different from left arrow

Ideally TAB + delete

PCSXNS can be run under applications

BAPI drivers (Bridge Applications Program Interface)

(-John Markano network support group

part of PCSTCP

guy @ 3-com who knows something

Michael Bowskey

Michael Donahue

654 xns router

Bill Lozoff
955-2607

PS-2 model 80 on loan

Ken Antolini 545-3819
(Sales/Mkt Rep?)

3-Meg RAM
44 Meg disk

- of 750 PC's, many are not connected to anything
- 3com, Novell, etc.] each LAN administered separately
  └ at least 6
- AT+T Sys V - on a Prime

Mainframes:
  Port Selector
  Data Network

Lots of ethernets
  CS-100 communications server gateways (Built by Bridge!) — Mostly XNS + TCP
  Serial connections to mainframes

What terminals/PCs are available for public use? (lab-by-lab basis (complete inventory))
Is it hard to allocate CS-100 ports? (if not, →) $345 each
Can we find an ethernet card w/ XNS drivers for a 386? - NO
  └ 386 should go through CS-100 serial lines
Are there enough publicly-accessible, LAN-connected PC's to worry about?
  └ Yes
Do any PC LAN's have a TSR for access to CS/100's from a program? - BAPI drivers

Simplest approach:
- get a 386 w/ 16 serial ports + put it on a CS/100 or the port selector.
- forget about networked PC's, except running EtherTerm w/ FE running on 386

From there, can upgrade both ends independently:
- 386 becomes XNS server; incorporate Bridge protocol — call Bridge for info
- get serial TSR for PC's, or build in net link capabilities

or an X.25 server

Thoreau Lavelle
338-2285
Behavioral/Social Science

~10 labs

3+ Network XTs, ATs, PS/2s + Macs

GS4 box bridges to Fiber Optic network
Bridge FOGnet

386-0380 Todd this week

Busy — 15 or 16 machines wired to port selector out of 50 PCs

- PCS/TCP ~~$1525~~ per network could allow use of FE over ethernet
  - Applications interface?
  - Server end compatability?
    - unix drivers?
    - Concurrent access to Bridge Comm. Servers?
      - does SFSU use TCP or XNS on Comm. Servers?
  - Cost of installation on existing 3+ LAN?
- Unix box connection?
- XNS equivalent

3+ Nettios should talk to XNS communications servers

Bridge or Routers?

CS-210 10 terms
CS-1 32 "

SFSU

Heidi Schmidt
Network Systems Manager

Computing and Communications Services
(415) 338-6175

San Francisco State University
1600 Holloway Avenue
San Francisco, California 94132

SFSU

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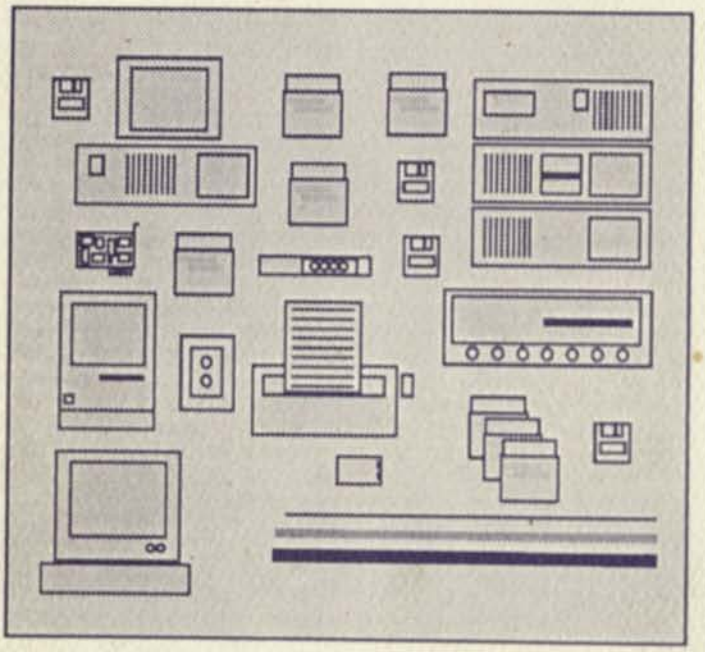
San Francisco, California 94132

Computing Services

Patrick Lathrop
System Support
415/338-1909

Computing Services
Network Support



SFSU

NETWORK GUIDE

January 1988

San Francisco State University
Computing Services

SFSU NETWORK GUIDE

by
David Ehrens
Network Support Group
January 1988

Table of Contents

Introduction

Using a data communications network is a lot like driving. The network is not only similar to a grid of roads, onramps, tollbooths and highways, but the use of a network has as many analogies.

Centuries ago, when people wanted to get from one place to another, we chose a path between two points, chopped the shrubbery and wore a path in the dirt.. After a while, we began to realize that permanent routes were a good way to get from place to place. So (for example) the Romans built a complex system of roads. Aside from their construction, it is interesting to note that they were not built in straight lines, but were constructed to accomodate the terrain they were built through. And the routes were interlaced with one another so that, seen as a whole, it was possible to use them to travel from one corner of the Roman Empire to another. An early network.

As traffic increased, highways required rules for their use. In 1903, New York had the first set of highway and municipal street regulations. Since then, one-way streets, rules of right-of-way, speed limits, rules governing what can be transported on highways, and the certification of vehicles travelling on public highways have been a fact of life for us.

This guide has been designed to give the reader an overview of the structure of the data communications network in place on the San Francisco State University campus, but also to help users access resources located elsewhere which can be accessed from this network. So, to continue with our highway analogy, we hope to make you comfortable travelling your own county routes, hitting the Interstates, driving aboard a trans-oceanic ship, driving off again in another country, and exploring those highways and routes. The only trick is to issue the correct series of instructions that will take you from one place to another. This guide has been organized to show you those commands.

Our goal is to provide you with an understanding of some basic types of data communications traffic, and to see how it all fits together in our own network, FOGNet. Whether you are a PC user with a 3Com network, a user with a "dumb" terminal communicating with the Micom port selector or a Bridge server, a Mac user using 3+Mac or TOPS - or whether you are an X.25 or modem user trying to access a computer elsewhere - this guide should be able to help you get where you want.

Connectivity

San Francisco State University's data communications network is a system for transporting data. It is a collection of different data communications technologies which were implemented at different times in the university computer system's history.

For example, there are old computer terminals wired directly to some of the campus computers and a device called a *port selector* (brought in later) to reduce the number of direct connections required between computers and terminals. There are links to other campuses around the state which use a technique called *X.25 packet switching* to make connections for many users over one physical wire.

At one point a powerful method for compressing many connections again into one *physical* connection called *T1* was used to provide many connections between the port selector and one of the university's VAX systems.

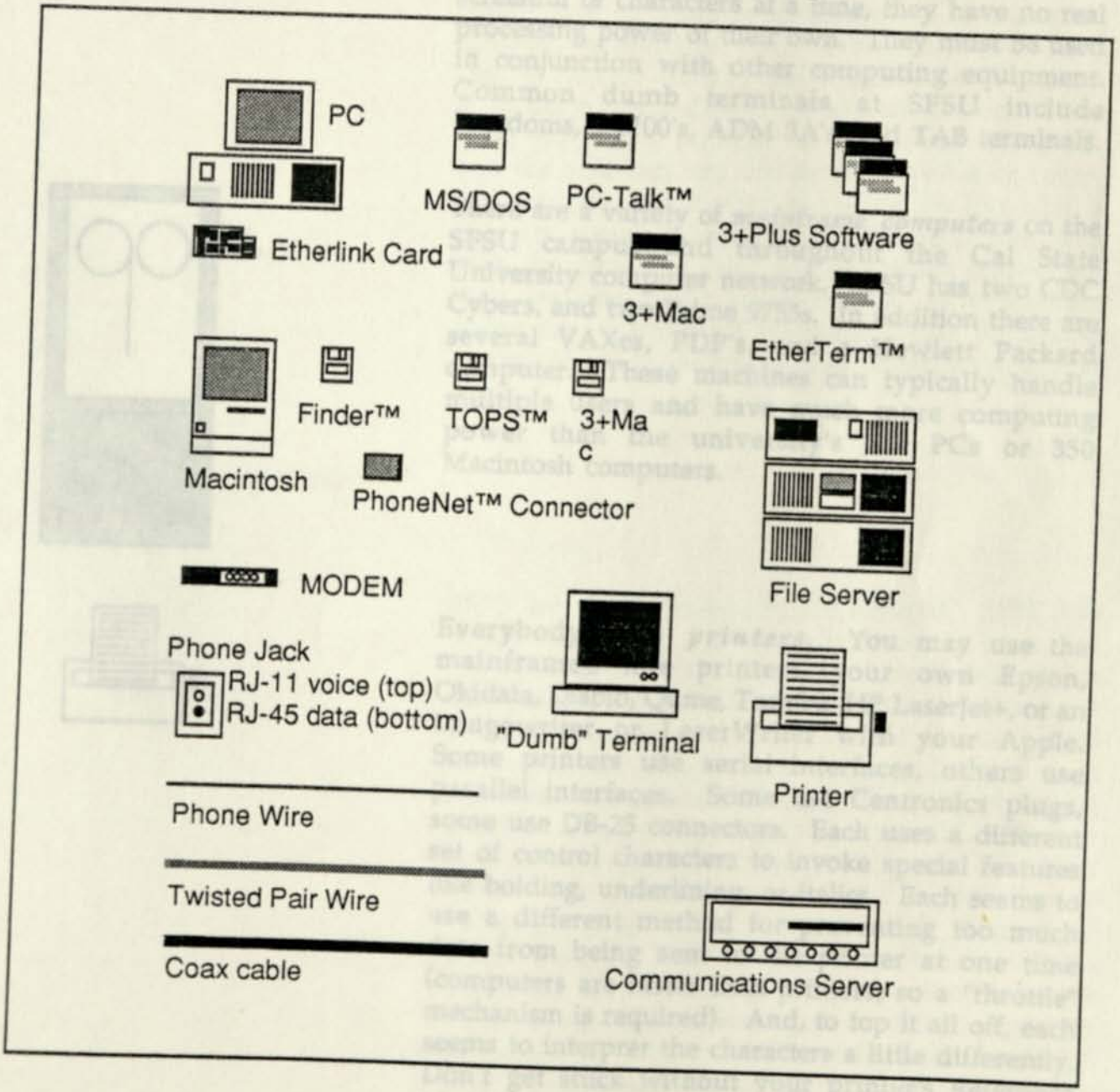
Recently, the campus was extensively wired with new data jacks at most phones (which are also new), providing a way for certain connections to be made over simple phone wiring. This will allow a number of terminals, printers - even Apple Computer networks - to run over campus phone wiring.

And, lastly, a new and powerful medium for transporting data called *Ethernet* has been put into place on campus. Ethernet, like X.25, moves data around in electronic envelopes, but does so at speeds 1000 times faster than most people are used to at their terminals. Ethernet runs over special wiring called *coaxial cable* and on newer *fiber optic cable*. The campus-wide Ethernet provides a way for a number of *Local Area Networks* to communicate with one another. *LAN*s are microcomputers and other devices which communicate with one another and share work and resources over (in our case) the Ethernet. LANs, then, require Ethernet, but the reverse is not true: the Ethernet is simply a backbone which provides a high-speed data transmission medium. We also can use Ethernet to carry data traffic from older devices which themselves cannot deal with the specialized *protocols* of Ethernet. In these cases, we use *communications servers* and *gateways*. For example, we use communications servers to allow modems, host computers, and teminals access to the Ethernet. We use a gateway to permit X.25 traffic to "hop on" the Ethernet.

All these services are in place and have been interconnected. Because there is such a diversity of equipment in use, making connections often entails understanding what services are available and how to use them. For example, from my desk I make a connection from my PC to the LAN which it is connected to. The LAN makes a connection to a communications server which in turn makes a connection to the port selector. The port selector makes a connection to an X.25 switch, which in turn connects to another such switch in Sacramento. That switch connects to one of two Cyber computers. *Finally* I log on and begin work...

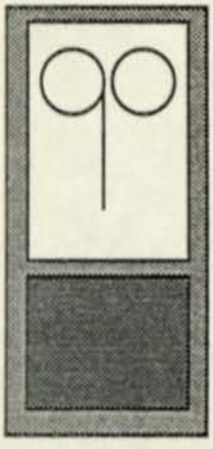
Components

Although, as we have described, the data communications network is actually a number of networks with different characteristics, transport speeds, features, limitations and services, to a *user* the network simply looks like a number of components he may use every day. Let's discuss some of the following equipment. We'll discuss it in terms of several major categories: *Traditional Networking, PC Networking, Macintosh Networking,* and *Bridge Networking.*

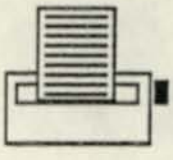


Traditional Networking Gear

Dumb terminals are often associated with computers because they are the most common interface users have to computing equipment. Dumb terminals have earned this name because, aside from clearing the screen or operating on a screenful of characters at a time, they have no real processing power of their own. They must be used in conjunction with other computing equipment. Common dumb terminals at SFSU include Freedoms, VT100's, ADM 3A's, and TAB terminals.



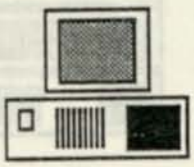
There are a variety of ***mainframe computers*** on the SFSU campus and throughout the Cal State University computer network. SFSU has two CDC Cybers, and two Prime 9755s. In addition there are several VAXes, PDP's, and a Hewlett Packard computer. These machines can typically handle multiple users and have much more computing power than the university's 750 PCs or 350 Macintosh computers.



Everybody uses ***printers***. You may use the mainframe's line printers, your own Epson, Okidata, Diablo, Qume, Toshiba, HP LaserJet+, or an Imagewriter or LaserWriter with your Apple. Some printers use serial interfaces, others use parallel interfaces. Some use Centronics plugs, some use DB-25 connectors. Each uses a different set of control characters to invoke special features like bolding, underlining, or italics. Each seems to use a different method for preventing too much data from being sent to the printer at one time (computers are faster than printers, so a "throttle" mechanism is required). And, to top it all off, each seems to interpret the characters a little differently. Don't get stuck without your printer's Reference Manual!

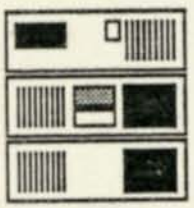
A ***modem*** is a device which lets you make a connection between a terminal and a computer without being near the computer. A modem works by converting digital data into audible data and sending it over a telephone line. Most common modems operate at either 300, 1200, or 9600 baud (a unit of transmission speed), with 1200 being the most common at present. In order to make a connection to another computer, you place an ordinary telephone call. However, you don't usually need to actually dial a phone. Most modern modems connect directly to the phone line. You enter the phone number on your terminal or PC, and the numbers are converted to pulse or rotary dial signals. The modem monitors the line until a friendly signal is received on the other end, and then the modems (and the computer equipment they are connected to) start talking. Most modems today use a command language called the Hayes command set to let a computer or terminal control them.

PC Networking Gear



PC's are used throughout the campus. SFSU has about 750 PC's. PC's usually have at least one floppy diskette drive. Some have hard disks which can contain substantially more data. Some have been attached to one of three types of Local Area Networks on campus. If you're attached to a network, you probably have some kind of log-on process. If not, you probably boot your PC and store data on either your hard disk or floppies. PC's have used at least 4 different processors in the past 7 years although they boast a very high degree of compatibility. The original PC's used an 8086 processor from Intel, a relatively slow machine which could only address up to 1 million characters of memory. Newer machines include the 80286 (the PC/AT) and the 80386, both of which offer greater speed and memory access.

The PC's operating system, *DOS*, has gone through a number of changes in the last 7 years. There are a number of operating systems which will run on PCs and their clones. DOS is the most common operating system for business and home use; it is a low-performance, single-user operating system which lets a program running under its control do almost anything. It is simple and easy to develop applications for. XENIX, on the other hand, is fairly common in applications which require more than one user to be able to use a PC/AT. There are others like Pick, Theos and QNX, but their use is highly specialized. Microsoft will be releasing OS/2 in 1988. This operating system requires a 80286 processor, and will be capable of running multi-user, multi-tasking programs. The operating environment will be significantly more complex than DOS's, and will require programs to be written for a shell called the Presentation Manager. Programs will no longer be limited to small amounts of memory and many of the problems associated with tricks caused by trying to work around DOS's limitations will disappear with OS/2.



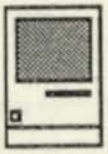
File servers are usually high-performance PC's which have hardware and software modifications to make them perform better as high-speed storage and delivery machines. A server has one main function in life: to store data and to send/receive it over a network to other personal computers. File servers can store massive amounts of data and can usually deliver it faster than a floppy diskette - even over a network. Most servers are PC's (like Novell's, 3Com's and Nestar's). But it is possible for mainframes to provide this function for PC's. Some examples of mainframe file servers include IBM's, VAXes, and Tandems - all reduced to pretending to be PC's.

DOS applications programs are generally limited to the use of 640K of addressable memory. Common application programs at SFSU include word processors like Microsoft Word, Samna, and database management programs like Rbase System V, dBaseIII+, PC Focus, Oracle, and Revelation. Other applications, like Lotus 1-2-3, provide number-crunching capabilities. Applications written for the PC include regular programs, device drivers, and TSR's - *terminate and stay resident* programs like Sidekick or Prokey - which compete with regular programs for operating system services.

Networking software for the PC usually requires hardware, a combination of normal programs, device drivers (to control the hardware), and TSR's. TOPS, Novell Advanced Netware and 3Com's 3+Plus network software all use these. There is usually a given set of services and functions which the network software offers. Device drivers are special programs which are used to control specific hardware on the PC. For example, many users are familiar with device drivers to control clocks and mice on PC's, or for controlling non-standard disk drives. The same is true of network hardware. In the SFSU environment, both Novell and 3Com networks use the 3Com EtherLink card, a board installed in the PC which can tap into the Ethernet cable. However, other Novell networks use Arcnet hardware. Different device drivers are used to control the specific hardware that the customer has purchased. Even within a 3Com network, different device drivers are used with different models of the EtherLink card.

An ***EtherLink card*** is used in an IBM PC (or compatible) to physically connect a PC to an Ethernet network. The "card" is actually a half-slot printed circuit board which fits inside your PC Some of these EtherLink cards also have a chip on them which enables the board to boot the PC from the network. If you can boot your PC without a hard disk or a floppy, you probably have one of these. If not, you still may have an EtherLink card, but without the EtherStart chip.

Macintosh Networking



The ***Macintosh computer*** is a product of Apple Computers. No one has made a clone yet. Macintoshes come in several varieties: the Mac, the Mac Plus, the Mac SE, and the Mac II. Most of the Macs look like the one on the left, except for the Mac II which looks a lot like an IBM PC/AT. The Mac II has a 68020 processor (unlike the others), but can still run about 60% of the software that the little Macs can. The little Macs can be interconnected via TOPS, Appleshare, or TangentShare and can share printers via AppleTalk (built into every Mac). The Mac II can support a variety of high-speed communications links with other systems when equipped with the right boards.

The ***Macintosh operating system*** is conceptually simple: the screen is a visual representation of your desk. To work with a program, you reach into folders, then click on objects in those folders with your "Mouse", an extension of your keyboard. The Macintosh operating system provides a number of very high-level facilities built into it: graphics, sound, music, file system, and networking.

Macintosh applications all share the icon-driven interface. Macintosh applications are generally much better at handing visual data than DOS. Word processing and desktop publishing programs and graphic design tools all work better on a Mac by virtue of its architecture -- even on the older Macs. Macintosh applications fall into two categories: programs and desk accessories. Programs are run in turn after other programs, but Desk Accessories can be "popped up" almost anytime. Some favorites include calculators, clocks, memo writers, and (you guessed it!) networking software.

Think of ***Macintosh networking software*** and the words AppleShare or TOPS generally come to mind. The Mac has a networking scheme called AppleTalk built right into it. AppleTalk permits Macs to share data at from 270,000 baud to 1 million baud. Compared with Ethernet's 10 million baud, this is peanuts, but for small workgroups, it works quite nicely. TOPS permits Macs to talk to Macs and even PC's and Unix systems. It is simple-to-use, relatively bug-free, and is in use in several departments on campus. 3Com too has a new product called 3+Mac which will permit Macs to participate in a 3Com (Ethernet) network. With the advent of the Mac II with its "open" architecture (permitting) third-party boards to be installed, AppleTalk will no longer have to be used as the networking scheme.

PhoneNet connectors are little grey boxes which have two phone plugs and an AppleTalk connector in them. Ordinary phone wire is used as a cable to connect computers within an Appletalk network. Typically, the connector is plugged into the back of a Mac, LaserWriter, Imagewriter, or PC with a special board from Centram or Tangent which can "speak" AppleTalk. Two phone wires connect the one connector with two other connectors attached to any of the already-mentioned devices. Aside from the phone wire and computer or printer, no other networking equipment is required since Macs and Laserwriters have AppleTalk built-in.

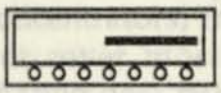
Bridge Networking

Phone plugs have recently been installed throughout the campus. Most have a voice jack on the top and a data jack on the bottom. The voice line is connected to a digital phone line and can not be used for modem communications unless a special connection was ordered. The data jack is probably not yet connected to anything. The data portion uses a different interface from the voice jack. Therefore, you should not switch your phone to the data jack, or vice versa! The data jack functions like an extension cord for a data line. It can be wired to connect to almost anything, but you need to place a Data Circuit Request for it to actually be connected to something.

Normal 4-wire ***phone wire*** can be used by AppleTalk for connecting printers. It is also possible to use the data jack's wiring instead of stringing actual phone wiring. Recently, Hewlett-Packard, DEC, 3Com, and AT&T all announced schemes for using normal phone wiring with EtherNets. Although normal phone wiring is not shielded as well from electrical interference as coaxial cable or Fiberoptic cable, it can also be used in place of some (not all) computer cables. At SFSU, many dedicated computer circuits will actually be implemented via phone wiring.

In the past, connections between computers and terminals were done by separate computer cables. One of the goals of the SFSU networking system is to get away from 70,000 separate data lines. Our Ethernet-based network will go a long way in this direction. Still, there are situations where ***dedicated wiring*** is either desirable or absolutely necessary. Odd cabling schemes or special circuits may require special dedicated circuits. In addition, every one of the hundreds of terminals and most of the printers on campus requires a dedicated cable - to at least run a few feet into some other kind of networking equipment.

Coaxial cable is used within the halls, walls, ceilings and closets to actually transport data on an Ethernet. If you have a PC with a thick (1/4") black wire on a T-shaped thing on the back of your PC, you're probably plugged into the Ethernet. This cable can not be used for any other purpose (like a printer or modem). But it can connect you with an incredibly powerful network, offering dozens of resources like printers, modems, and a myriad of connections to other networks.



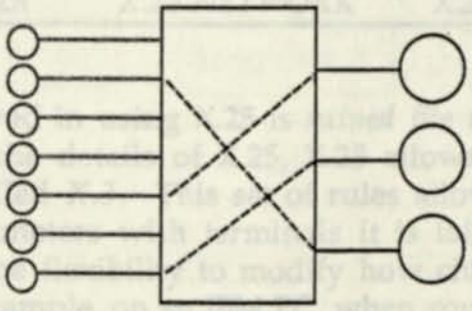
Those of you who do not have an EtherLink card and coaxial cable on your PC - or those of you who have a dumb terminal - all hope is not lost! You can still use Ethernet to access many of the network resources, although you can not participate in a PC network (since you won't have an Ethernet-connected PC). To access the network you will be using a ***communications server***. This device has a number of connections to dumb terminals and PCs on one side, and a single connection to the Ethernet on the other. The communications server not only translates dumb terminal language to Ethernet, but provides a means for you to establish links to other equipment on campus and throughout the state.

Major Switching Equipment

By now you hopefully have a good idea of most of the equipment which you'll be using in your daily encounters with the network. But there is also a variety of equipment which you don't see. In the following pages we'll discuss the *Port Selector, X.25 Packet switching (CSUNET), Modems, the new phone jacks,* and *Ethernet.*

The Port Selector

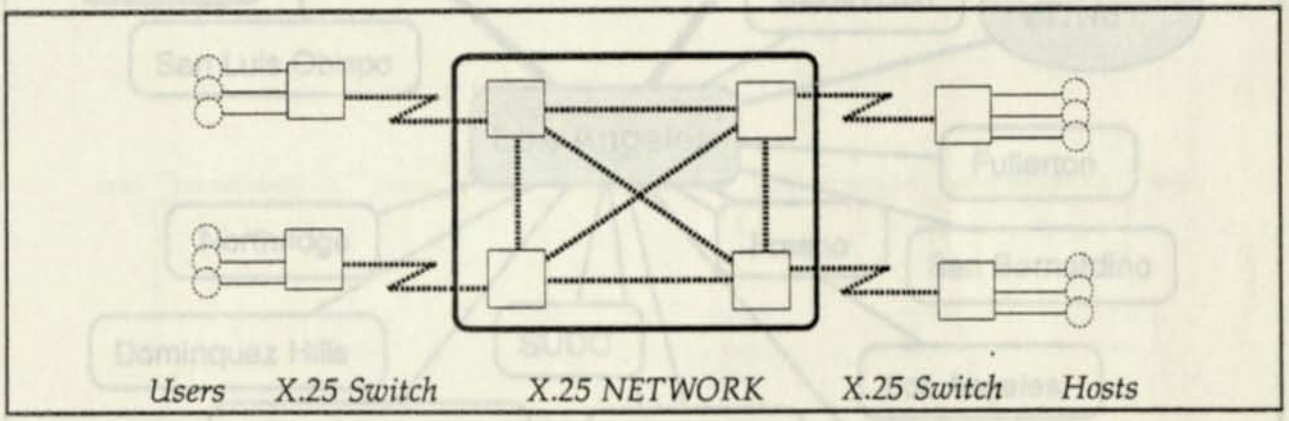
There are many common techniques for "bundling" lines together: multiplexors, concentrators, front-end processors, data switches, T1, X.25, and Ethernet. We will not cover most of these in this document. Suffice it to say, the advantages of sharing data paths are readily apparent: when one line is installed, it is pre-wired to handle *n* number of connections. However, this scheme does impose a finite limitation to the number of connections possible from one point to another. A variation on this theme, the *port selector*, permits connections from one device to another to vary as needed, so that if a terminal needs to access multiple hosts, it can be done without requiring multiple lines from the terminal. Lines must be run to and from the port selector for each device, and there are limits on the speed and type of devices which can be attached in this manner. Typically, a user connects to the port selector from a terminal. The port selector presents the user with a menu, asking him/her which host s/he wishes to connect to. The port selector then establishes the connection.



How a port selector works

X.25 Packet Switching

Schematically, X.25 looks a little like the port selector. The main difference is that, whereas connections are made within a box (port selector), the connections are made within a wide-area network by X.25. Additionally, X.25 involves routing *packets* of data (bundles of data enveloped much like telegrams), whereas the port selector deals in physical connections. In the diagram below, the X.25 network is represented by four nodes (the SFSU X.25 network has three). These nodes not only ship and receive data packets, but they also perform routing functions for other nodes. In our case, SFSU users can access CSU computers all over the state by using an X.25 network maintained by the Chancellor's Office. San Francisco is one of three statewide CSU X.25 Network hubs which provides routing of calls to and from other locations in addition to enabling our users to use other computers on the network. Special switches called *PADs* (packet assemblers/disassemblers) are required to talk to the nodes of the X.25 network. Host computers or clusters of terminals are generally connected to these PADs.

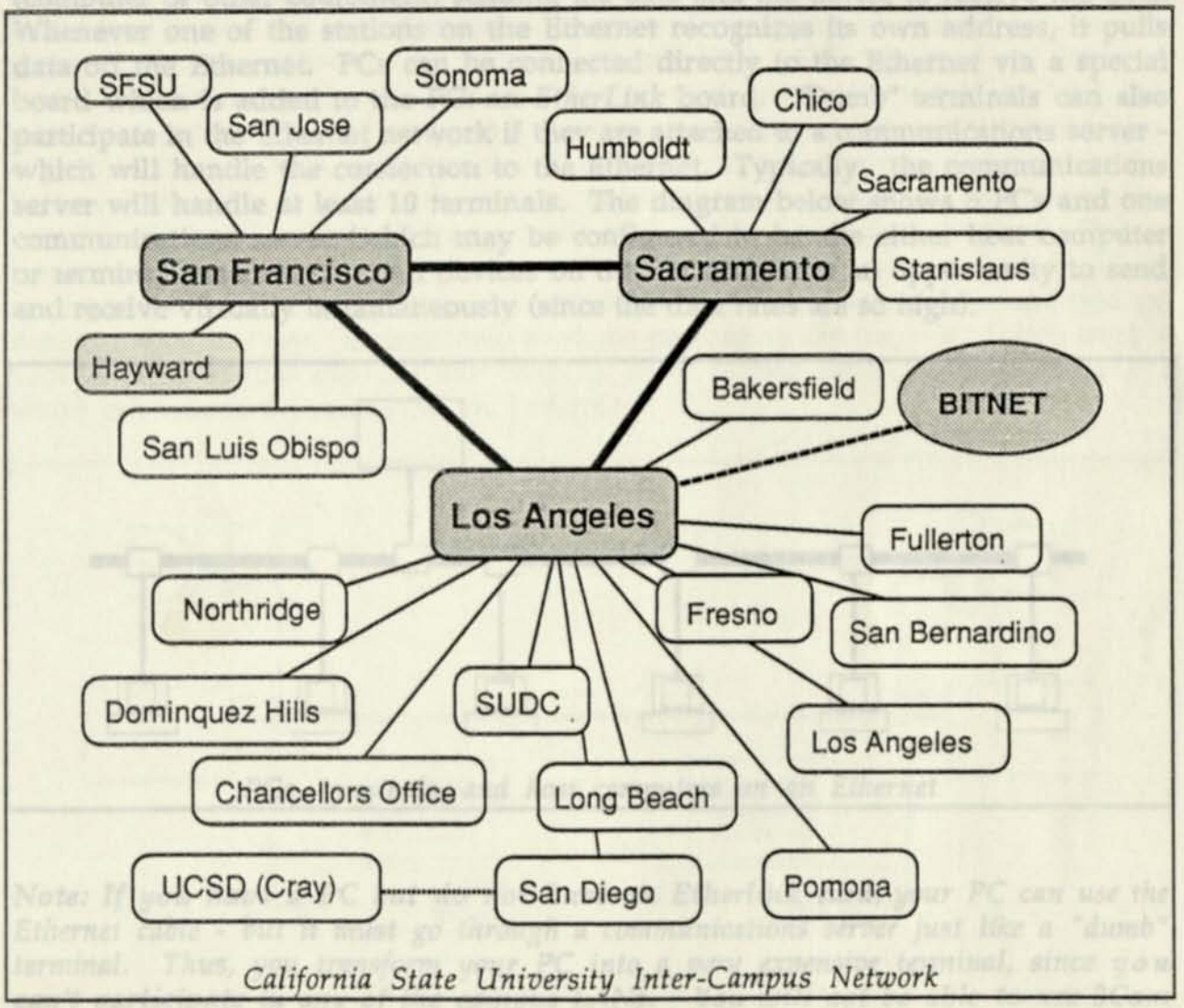


One of the *gotcha's* involved in using X.25 is *ruined file transfers.* Without getting enmeshed too deeply in the details of X.25, X.25 allows the *PADs* to talk to one another via a protocol called *X.3*. This set of rules allows a host computer to set default conversation parameters with terminals it is talking to. When X.25 was developed, it was given the flexibility to modify how characters sent and received are to be processed. For example, on an IBM PC, when you press the *ENTER* key you actually transmit the *ASCII* characters 13 and 10. On a Macintosh, only the 13 is transmitted. X.25 tries to make it easy for hosts by filtering and modifying text *as it is being sent*. This allows PADs to provide a common interface to hosts, but it wrecks file transfers. If you are having trouble with file transfers, check your PAD parameters :

Pad> **par?**
par1:16,2:1,3:2,4:0,5:1,6:5,7:21,8:0,9:0,10:0,11:3,12:1,13:4,14:0,15:0,16:127,17:24,
18:18,19:2,20:255,100:3,101:0,102:0,103:17,104:19,105:0,106:0,107:0,108:15,
109:0,110:0,111:1,112:0,113:0,114:0,115:0,116:0,117:0

Write them down and contact Network Support. The parameters can be changed so that file transfers will work across an X.25 network.

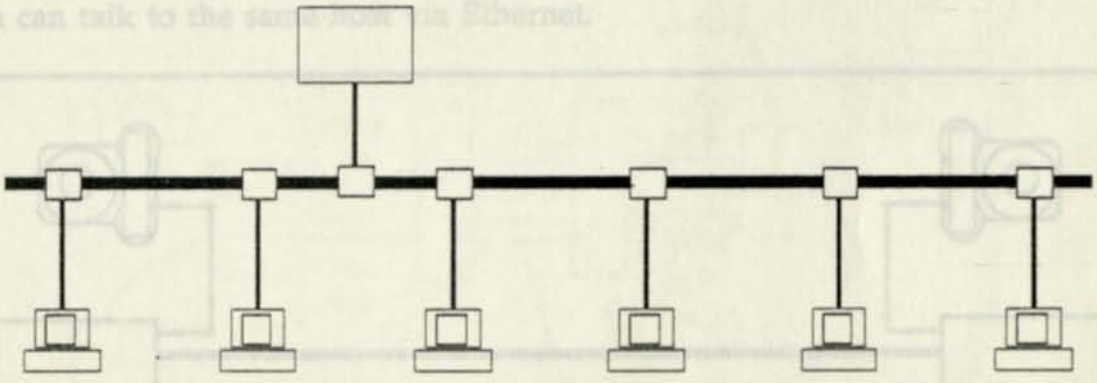
The X.25 network resources available to users include the following nodes:



California State University Inter-Campus Network

Ethernet

In the case of Ethernet, a number of devices are attached to a special cable which transfers data at 10 million bits per second, an extremely high speed. Data is moved along this common data channel in packets which contain the address of a device (computer or other equipment) sending the data and the device to receive the data. Whenever one of the stations on the Ethernet recognizes its own address, it pulls data off the Ethernet. PCs can be connected directly to the Ethernet via a special board which is added to the PC: an *EtherLink* board. "Dumb" terminals can also participate in the Ethernet network if they are attached to a communications server - which will handle the connection to the Ethernet. Typically, the communications server will handle at least 10 terminals. The diagram below shows 6 PCs and one communications server (which may be configured to handle either host computer or terminal attachments). All devices on the network have an opportunity to send and receive virtually instantaneously (since the data rates are so high).

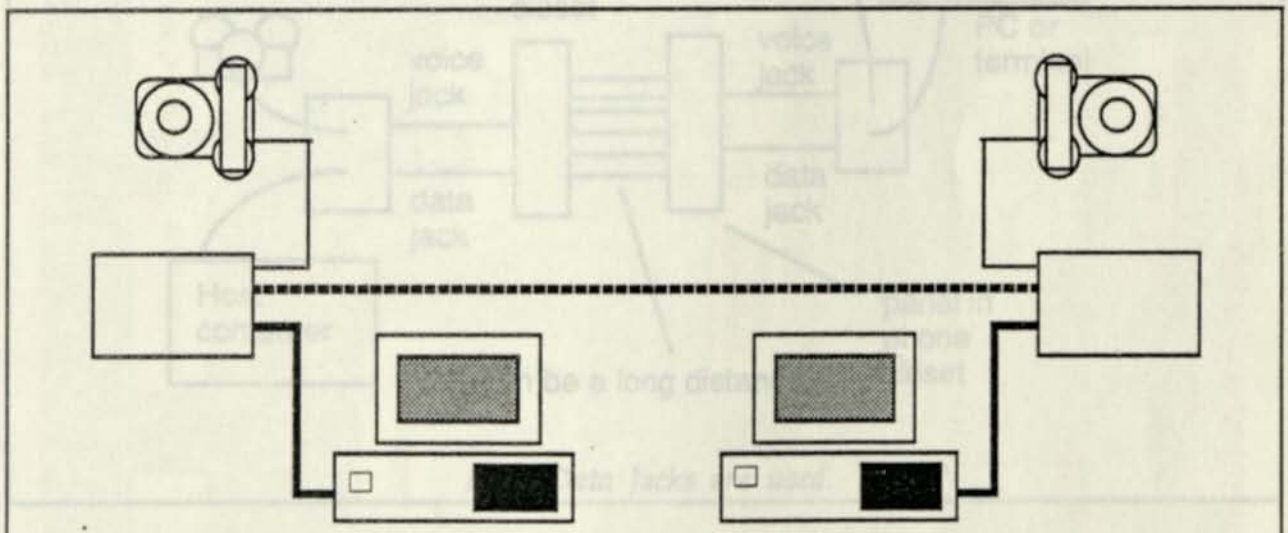


PCs, terminals, and host computers on an Ethernet

Note: If you have a PC but do not have an Etherlink card, your PC can use the Ethernet cable - but it must go through a communications server just like a "dumb" terminal. Thus, you transform your PC into a very expensive terminal, since you can't participate in any of the campus LANs. You will not be able to use 3Com EMAIL, use EtherTerm, or access networked databases.

Modems

Not every PC on the network will participate in an Ethernet. Many users will simply dial up other computing resources via a modem. A *modem* works by *modulating* (converting) the data from a computer or terminal into a sound. The sound is transmitted over the phone line, received by the modem and *demodulated* (converted back) from sound to data. In general, data transfer rates are quite low (generally between 1200 bits per second and 9600 bps). Although we have depicted two PCs communicating, this scheme will also work between a dumb terminal and a host computer. At SFSU, we use a number of modems and incoming phone lines organized into a *rotary*. When someone calls the dialup number, s/he reaches the first available phone line which, in turn, is connected to a modem. You may have occasionally heard a high-pitched whistle when calling a modem number. This is the sound of a modem talking to *you*. *This scheme is to be strongly discouraged for use on campus*. Not only are the data transfer rates low, but two phones are tied up during a data transfer. Besides, two modems permitting the transfer of data from a host to a PC at 9600 bps *cost four times as much* as one EtherLink board in a PC which can talk to the same host via Ethernet.

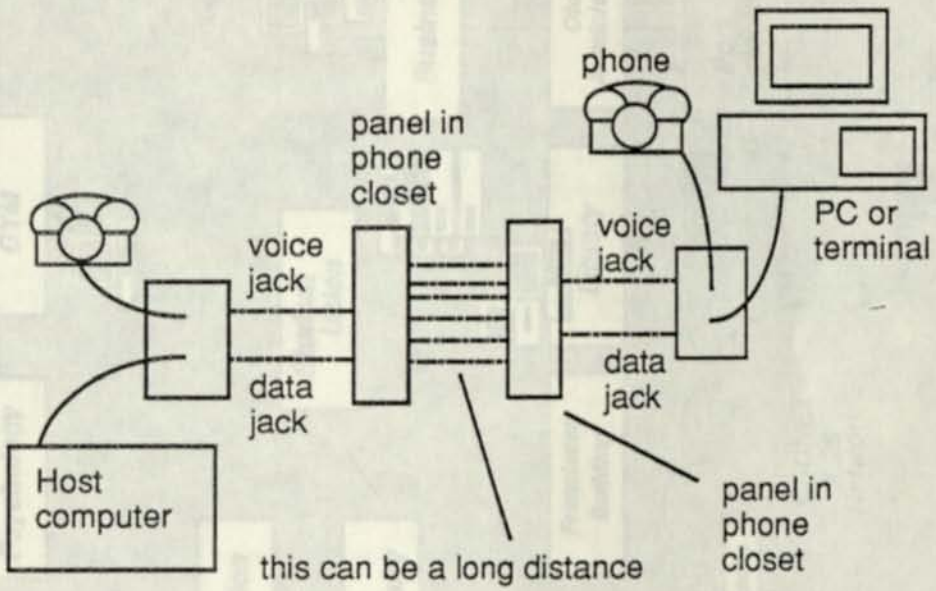


2 PCs communicating over a phone line

In the picture above, the dashed line represents a phone line between two modems. On many modems it is possible to optionally attach a phone so the line can be used for voice when it is not used for data. We've depicted two PCs talking to each other. A serial cable (solid black line) attaches the modem to the PC.

Cross Connects

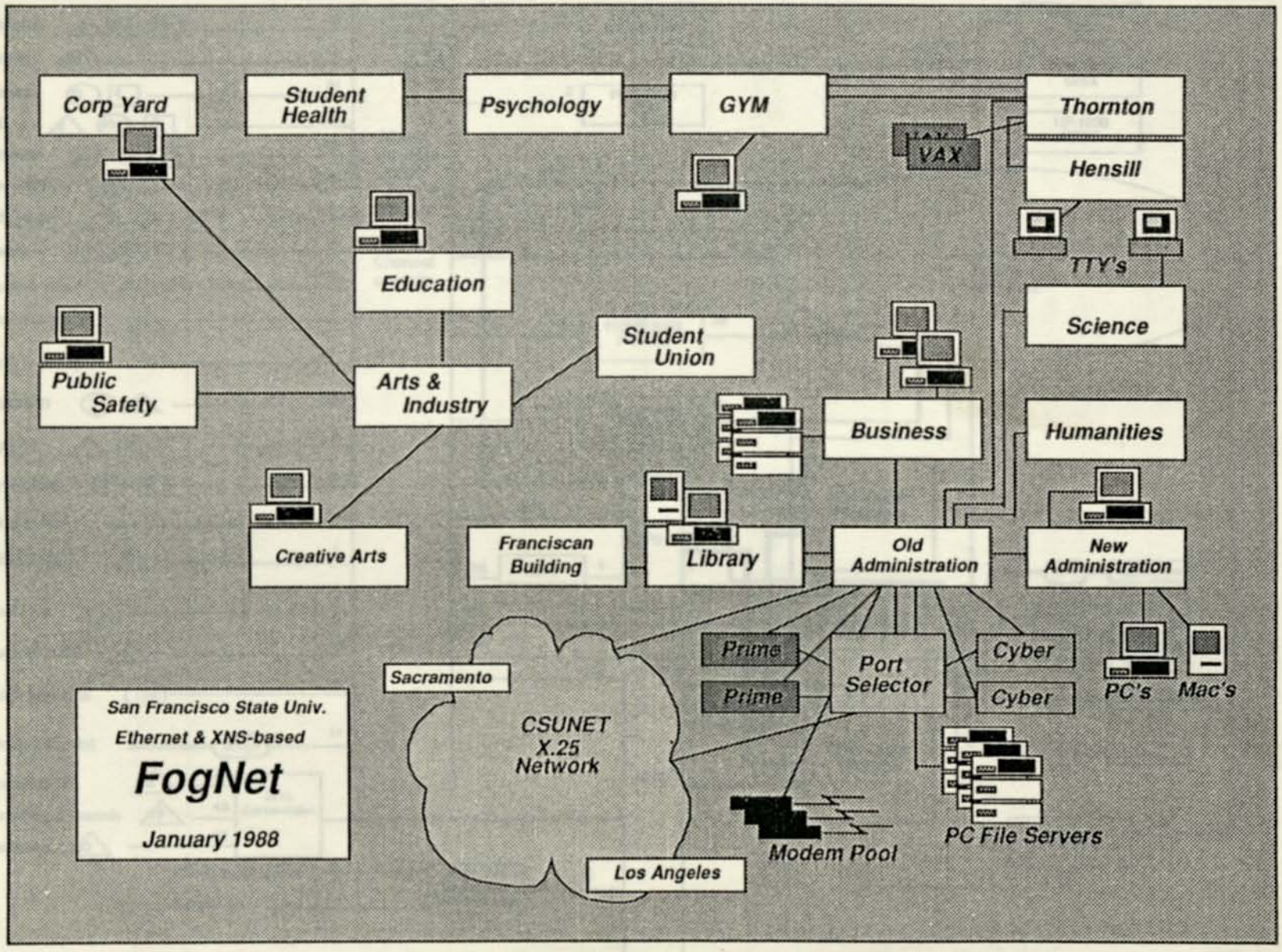
There are situations where dedicated wiring is done by using *cross connects.* This scheme uses the campus phone wiring to provide wiring for terminals or printers. Cross-connects are done with the data jack on campus telephone sets in situations where a terminal is needed in the same room as a phone. The new phone jacks have two plugs: one for voice (top) and one for data (bottom). Where this is used, you will see what appears to be a phone wire running from your data jack (RJ-45) to a 25-pin computer plug (RS-232C) on your terminal *or PC functioning as a terminal.* You may see a terminal wired (via cross-connects) to a Bridge communications server, which allows the terminal to then enter the Ethernet network. Sometimes it will simply go halfway across campus to a computer.



How Data Jacks are used

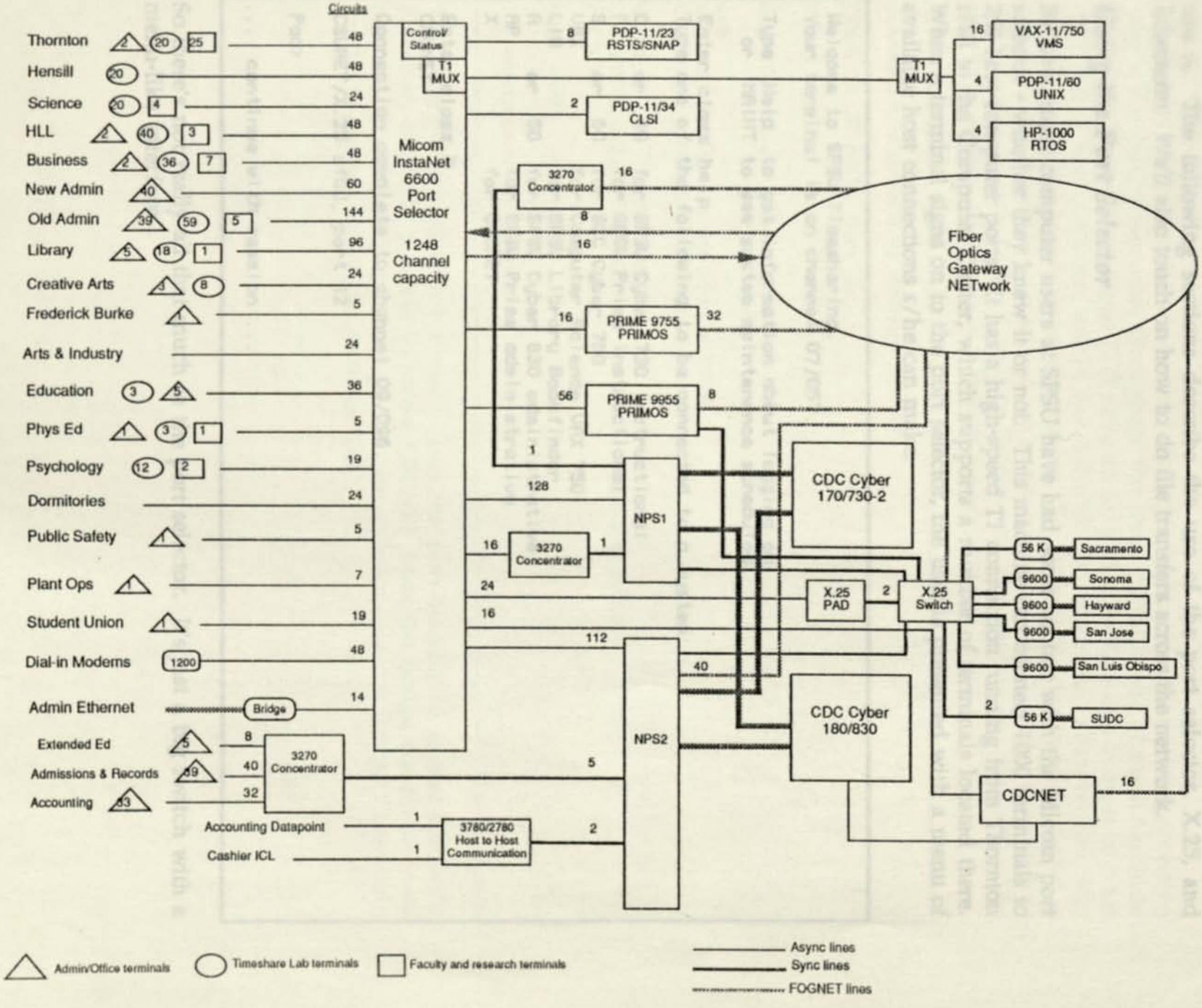
In this way, the campus phone wiring becomes a giant "extension cord" for computer wiring. However, wiring is already in place throughout the campus. So, in most cases, connecting one device with another simply involves making the correct connections in the phone wiring closets.

This scheme can also be used to connect printers to LAN servers. It turns out that most LANs require printers to be directly-connected to the serial ports of a server. Because the servers may not be near the printers and because *LAN printers do not themselves use Ethernet*, they must be connected via this method.


Corp Yard
Student Health
Psychology
GYM
Thornton
VAX
Hensill
TTY's
Education
Science
Student Union
Public Safety
Arts & Industry
Business
Humanities
Creative Arts
Franciscan Building
Library
Old Administration
New Administration
Prime
Prime
Port Selector
Cyber
Cyber
PC's
Mac's
Sacramento
CSUNET X.25 Network
Modem Pool
PC File Servers
Los Angeles
San Francisco State Univ.
Ethernet & XNS-based
FogNet
January 1988

SFSU Data Communications Plan: Twisted-pair Circuits

June 1988



mbad 8/87

How-To Section

Now that you know *what* everything is and *where* it is, you need to know *how* to use it. The following sections describe the use of the port selector, X.25, and Etherterm. We'll also touch on how to do file transfers across the network.

Using the Port Selector

By now, most computer users at SFSU have had some contact with the Micom port selector - whether they knew it or not. This machine can connect 1000 terminals to 250 host computer ports. It has a high-speed T1 connection running from Thornton Hall to the Computer Center, which supports a number of terminals located there. When a terminal signs on to the port selector, the user is presented with a menu of available host connections s/he can make:

```
Welcome to SFSU Timesharing.
Your terminal is on channel 07/057.

Type  Help  to get information about logging on,
  or  MAINT to see system maintenance schedules.

Enter class help
Type one of the following to be connected to a system:

C    or  40  for SFSU Cyber 730 instructional
P            for SFSU Prime instructional
S    or  60  for SCC Cyber 760
VAX          for Computer Science VAX 750
LIB          for SFSU Library Bookfinder
A    or  50  for SFSU Cyber 830 administrative
AP           for SFSU Prime administrative
X            for CSUNET

Enter class X
CSUNET

Connection complete to channel 09/096.

CSUNET/X.25 sf02, port 12

Pad>

...  continue with session ...
```

So there's not really all that much to the port selector. It's just a big switch with a menu-like interface.

Using the X.25 PAD

Introduction

The X.25 Network has been described already. It provides a means for accessing remote computing resources throughout the state. SFSU is one of three backbone nodes in a statewide academic X.25 network providing services to a number of other campuses. Each location within the network has a network abbreviation, and specific computing resources have a number. So, for example, to access the Cyber at San Francisco State, the user would use a connect command (*C*) with the parameters .SF/01. To connect with a Cyber in Sacramento, the user enters: c ***.sac/01***. The following sample session should explain the procedure:

```
Connection complete to channel 09/096.

CSUNET/X.25 sf02, port 12

Pad>c  .sf/01

CSUNET/X.25 sf01, port 9

com
WELCOME TO THE NOS SOFTWARE SYSTEM.
COPYRIGHT CONTROL DATA 1978, 1987.

87/09/01. 19.11.58. A2A0401
CAL STATE CYBER 170/760.                NOS 2.5.2-678/0.
FAMILY:

USER NAME:  ,new,user

... continue with session ...
```

The example shown above actually uses the port selector to access CSUNET. However, it is also possible to access CSUNET from the Bridge communications servers. Instead of going through the port selector, use the Bridge Connection Service to access a clearinghouse name *X25*.

The following PAD addresses may be accessed at this time:

bak/01	Bakersfield	Cyber 730
bak/10	Bakersfield	Prime 9750
ccs/01	CSU-SCC, Development System	Cyber 174
ccs/02	CSU-SCC, Instructional System	Cyber 760
ccs/05	CSU-Chancellor's Office	Cyber 730/760
ccs/10	CSU-SCC	Prime 9750
chi/01	Chico	Cyber 720
chi/10	Chico	Prime 9750
chi/11	Chico	Prime 9750
coc/05	Chancellor's Office	Cyber 730/760
dh/01	Dominguez Hills	Cyber 730
dh/10	Dominguez Hills	Prime 9750
fre/01	Fresno	Cyber 720
fre/10	Fresno	Prime 9750
ful/01	Fullerton	Cyber 730
ful/10	Fullerton	Prime 9750
ful/11	Fullerton	Prime 9750
ful/12	Fullerton	Prime 9750
hay/01	Hayward	Cyber 720
hay/10	Hayward	Prime 9750
hum/01	Humboldt	Cyber 720
la/01	Los Angeles	Cyber 730
la/10	Los Angeles	Prime 9750
la/11	Los Angeles	Prime 9750
lb/01	Long Beach	Cyber 750
lb/10	Long Beach	Prime 9750
lb/11	Long Beach	Prime 9750
nor/01	Northridge	Cyber 750
nor/10	Northridge	Prime 9750
pom/01	Pomona	Cyber 730
pom/10	Pomona	Prime 9750
sac/01	Sacramento	Cyber 730/830
sac/02	Sacramento/Plato System	Cyber 730
sac/21	Sacramento	CCVAX1
sac/22	Sacramento	CCVAX2
sac/23	Sacramento	CCVAX3
sb/01	San Bernardino	Cyber 720
sb/10	San Bernardino	Prime 9750
sd/01	San Diego	Cyber 750
sd/10	San Diego	Prime 9750
sd/20	San Diego	CCVAX1/CRAY
sf/01	San Francisco	Cyber 730/830
sf/10	San Francisco	Prime 9755
sj/01	San Jose	Cyber 730/830
sj/10	San Jose	Prime 9750
slo/00	San Louis Obispo	Port Selector
slo/02	San Louis Obispo	Cyber 730
slo/10	San Louis Obispo	Prime 9750
slo/11	San Louis Obispo	Prime 9750
slo/30	San Louis Obispo	UUCP
son/01	Sonoma	Cyber 730

son/10	Sonoma	Prime 9750
sta/01	Stanislaus	Cyber 720
sta/10	Stanislaus	Prime 9750

Using Bridge Connection Service

Bridge Communications servers are used to provide a means for lower-speed asynchronous devices, such as terminals, serial printers, host port connections, and modems, to access the services of the Ethernet.

There are several types of communications servers, each of which is used for a particular operating environment The important thing, though, is that all communications servers use a common set of *Connection Service* commands. The commands permit users to:

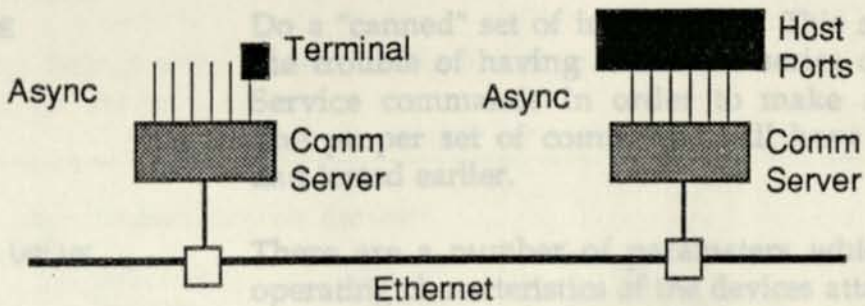
- establish or break connections between a terminal and other resources on a local or remote network,
- switch among multiple connections,
- display and modify configuration parameters,
- execute predefined sets of commands called *macros.*

Using a communications server requires the use of a terminal or a PC which can emulate a terminal (such as a PC running EtherTerm software from Bridge Communications). Before we begin, though, let's define a couple of important terms:

Port — the interface between your terminal and the communications server to which it is attached.

Session — a logical connection between your terminal and a resource on your local network.

A port, then, is simply a slot for a data communications line to be plugged into the communications server, while a session is a connection you have established with, say, a host at another end of the network, or with a modem from a modem pool.



Two Communications Servers in Session

The terminal on the communications server on the left is capable of having more than one session at a time - thanks to the communications server. Thus, it could be talking to one (or more) of the host ports on the right *at the same time it is talking to other ports elsewhere on the network!*

Managing Communications Servers

Communications servers which serve campuswide resources are administered by Network Support. These include servers which handle host connections, X.25 gateways, and those attached to modems. It is possible, however, given the distributed nature of the SFSU network, for network resources to be administered ***locally***. Happily, Bridge permits a distinction to be made between global and local network managers. Thus there are three classes of users: global network managers; local network managers; and users. A global network manager can issue Connection Service commands ***anywhere*** on the network. The local network manager can set communication server parameters on his/her own server, and thus provide a service for his/her own users. The user can access any resource for which s/he has permission.

Commands

For users, there are several commands it is helpful to know:

C NAME	Connect. The user enters the C command to specify the name of the resource s/he wishes to connect to. It is possible to specify Ethernet addresses and port ids, such as &000ABAD10800200DF02!130, however aliases (called clearinghouse names) will be used instead. *To list the available connection addresses, the user should issue the SH CHN (show clearinghouse) command.*
DC	Disconnect. The user enters the DC command to disconnect his/her current session.

DO MACRONAME

Do a "canned" set of instructions. This saves the user the trouble of having to enter a series of Connection Service commands in order to make a connection. The proper set of commands will have been written and tested earlier.

SET PARAM = VALUE

There are a number of parameters which define the operating characteristics of the devices attached to ports on communications servers. For example, modems are "defined" differently than host computers. Terminals are defined differently, as well. Some terminals run at 1200 baud, others run faster, etc. etc. The global or local network manager can set up default values for the devices attached to communications servers, but the user can also modify them (at least temporarily). *This command may be restricted on certain communications servers.*

SH KEYWORD PARAM

Sometimes it is nice to be able to see what your terminal is set to. The SH command can show you a number of things.

Sample Sessions

The following dialogs were taken from an actual session on a terminal attached to a communications server.

```
Welcome to your Communication Server!
cs/100> set ?
BAud            BSDelay         BSPad           CRDelay         CRPad
DataBits        DeVice          DUplex          FFDelay         FFPad
InterAction     LFDelay         LFPad           PARIty          PRIvilege
StopBits        TabDelay        TabPad
cs/100> ? set                   SHOW POSSIBILITIES FOR SET COMMAND
    Connect     <address>[,<address>] [ ECM ] [ Q ]
    DO          <macro name>
    Echo        <string>
    Listen
    Pause       [<seconds>]
    SET         <param-name> = <value> ...
    SHow        <argument> ...
cs/100> ?                       SHOW ALL COMMANDS FOR NET MANAGER
    Connect     ( <address> ) <address>[,<address>] [ ECM ] [ Q ]
    DEFine      <macro name> = ( <text> )
    DisConnect  ( <address> ) [<session number>]
    DO          <macro name>
    Echo        <string>
    Listen      ( <address> )
    Name        <clearinghouse-name> = <address>[,<address>]
    Pause       [<seconds>]
    ReaD        ( <address> ) <option> <parameter>
    ROtary      !<rotary> [+|-]= !<portid>[-!<portid>] , ...
    SET         <param-name> = <value> ...
    SHow        ( <address> ) <argument> ...
    UNName      <clearinghouse-name>
cs/100>sh ?                     SHOW ALL SHOW COMMANDS
    SHow    ( <address> ) DefaultParameters [<param-name> ...]
    SHow    GLobalPARameters
    SHow    MACros [<macro-name>]
    SHow    NetMAP
    SHow    ( <address> ) PARAmeterS [<param-name> ...]
    SHow    <param-name> ...
    SHow    RemoteNets [ <netid> ...]
    SHow    ROtaries
    SHow    ( <address> ) SESsions [ P ]
    SHow    VERSion
    SHow    VirtualPorts
```

```
 cs/100> show glpar                              SHOW GLOBAL PARAMETERS
 ..............................Global
Parameters..............................
 DATE = Tue Sep  1 18:35:00 1987          LogoffStr = ""
 WelcomeString = "^MWelcome to your Communication Server!^J"
 DOmain = "Admin"                         Organization = "SFSU"
 PROmpt = "cs/100> "                      NMPrompt = "cs/100> "
 LocalPassWord = ""                       GlobalPassWord = ""
 CONNectAudit = ON                        ERRorAudit = ON
 AUditServerAddress = &000ABAD1%08000200A2E2
 cs/100>sh ?                                     SHOW VALID SHOW COMMANDS
      SHow     SECuritySTATisticS
      SHow     ( <address> ) SESsions [ P ]
      SHow     ( <address> ) STATisticS [ Sample | Min | <hour> | Day ]
      SHow     VERSion
      SHow     VirtualPorts
 cs/100> sh ro                                   SHOW ROTARIES
 Rotary !128 = !2-!8
 Rotary !129 = !9-!11
 Rotary !130 = !12
 Rotary !131 = !8-!13
 Rotary !132 = !8-!13
 Rotary !133 = !8-!13
 Rotary !134 = !8-!13
 Rotary !135 = !8-!13
 cs/100>sh ?                                     SHOW ALL SHOW COMMANDS
      SHow     ADDRess
      SHow     AllSessions [ p ]
      SHow     AttachedNets
      SHow     ClearingHouseNames [ <name> [ @ <domain> [@ <organ.> ] ] ]
      SHow     CONFigurationS [<filename>]
      SHow     ( <address> ) DefaultParameters [<param-name> ...]
      SHow     GLobalPARameters
      SHow     GRoupPassWords
      SHow     MACros [<macro-name>]
      SHow     NetMAP
      SHow     ( <address> ) PARAmeterS [<param-name> ...]
      SHow     <param-name> ...
      SHow     RemoteNets [ <netid> ...]
      SHow     ROtaries
      SHow     SECuritySTATisticS
      SHow     ( <address> ) SESsions [ P ]
      SHow     ( <address> ) STATisticS [ Sample | Min | <hour> | Day ]
      SHow     VERSion
      SHow     VirtualPorts
 cs/100> sh netmap                               SHOW A NETWORK MAP
                          NETWORK &0004196B MAP

   0-%080002002684      1-%08000200E258
```

```
cs/100> sh chn ?
     SHow    ClearingHouseNames [ <name> [ @ <domain> [@ <organ.> ] ] ]
 cs/100> sh chn
 Querying Clearinghouse...
 Clearinghouse Name `*' ==>
 ps@Admin@SFSU          cyber@Admin@SFSU    modem@Admin@SFSU     test@Admin@SFSU
 manager@Admin@SFSU     test3@Admin@SFSU    bad1@Admin@SFSU      gs4@Admin@SFSU
 icx@Admin@SFSU         ap@Admin@SFSU       test1@Admin@SFSU
 cs/100>
 cs/100> sh chn ?
     SHow    ClearingHouseNames [ <name> [ @ <domain> [@ <organ.> ] ] ]
 cs/100> sh chn
 Querying Clearinghouse...
 Clearinghouse Name `*' ==>
 ps@Admin@SFSU          cyber@Admin@SFSU    modem@Admin@SFSU     test@Admin@SFSU
 manager@Admin@SFSU     test3@Admin@SFSU    bad1@Admin@SFSU      gs4@Admin@SFSU
icx@Admin@SFSU         ap@Admin@SFSU       test1@Admin@SFSU
 cs/100> sh dp 15
 DefaultParameters  for PortId !15
.....................Port Transmission and VTP Characteristics.....................
 AccessGroup = ( 1 ) AccessWord = ( 1 )  BUffersize = 82
 DeVice = ( Terminal, Glass )
 InterAction = ( Verbose, Echo, MacroEcho, MacroBreak, BroadcastON, NoLFInsert )
 InitMacro = ""          MaxSessions = 2      PRIvilege = User
.........................Port Physical Characteristics.........................
 BAud = 9600             BSPad = None         CRPad = None         FFPad = None
 LFPad = None            TabPad = None        DataBits = 8         DUplex = Full
 LinePRotocol = ASynchronous                  PARIty = None        StopBits = 1
 UseDCDout = ( AlwaysAssert, NoToggle )  UseDTRin = Ignore
.................Session Transmission and VTP Characteristics..................
 BReakAction = ( InBand )                     BReakChar = Disabled
 DIsconnectAction = None                      DataForward = None   ECHOData = OFF
 ECHOMask = ( AlphaNum, CR, Term, Punct )                          ECMChar = ^^
 EOM = Disabled          FlowControlFrom = ( Xon_Xoff )
 FlowControlTo = ( Xon_Xoff )                 FlushVC = OFF        IdleTimer = 2
 LongBReakAction = IGnore                     LFInsertion = None   MOde = Transparent
 XOFF = ^S               XON = ^Q
..................Session & User Interface Editing parameters..................
 ERAse = ^H              LineERAse = ^U
 LocalEDiting = ( NoDataEditing, CmdEditing )                      ReprintLine = ^R
 VERBatim = ^V           WordERAse = ^W
 cs/100>
```

EtherTerm Guide

Those of you who use the 3Com Network should already be familiar with 3Com's network commands. The purpose of this section is not to explain how to use *3+Share* software, but how to use *FOGNET*. There is a Bridge product called *EtherTerm* which enables users on 3Com networks to connect to Bridge-based Ethernets, communicate with communications servers, and connect to remote hosts as if they were locally-attached terminals. Etherterm is invoked by running the program ET at the DOS command prompt:

```
                *** SFSU EtherTerm Connection Service ***
                      ***  Hit F2 to connect  ***
CONNECT TO HOST PORT:         PS@Admin@SFSU
DISCONNECT FROM HOST                                          Connected:  No

REENTER DOS (type "exit" to return)
EXTERNAL TERMINAL EMULATOR:

When to make connection: (MM/DD HH:MM)
Current date & time:     (MM/DD HH:MM)  09/01 18:13

Next script file if cannot connect:

CHANGE SELECTED MENU FILES:    default
READ CONNECT MENU FILE:        default
WRITE CONNECT MENU FILE:       default
LIST CONNECT MENU FILES

Connect to the host using the specified port.

1HELP 2DO 3CONNECT 4SCRIPT 5CONFIGURE 6TRANSFER 7KEYBOARD 8PRINT 9FILES 10EXIT
```

The name *PS@Admin@SFSU* is an alias for a numeric network address. So, instead of requesting to be connected with *&000ABAD1%08000200DDFF!187* a user request connection with *PS* (port selector) in domain *ADMIN* in the organization *SFSU*. At this point, a word of explanation is in order. Each name consists of three parts:

Name @ Domain @ Organization

The name is usually an alias for the network address mentioned above (in Bridge terminology a *clearinghouse name*). The names usually correspond to one or more physical devices which, in turn, are often made up of rotaries of available lines. Therefore, if you can't get one line on one network server, the next available one will be tried. If none is available, you will be informed with the message: *Host Busy.*

Assuming all goes well, the user will connect with the proper host, in this case the port selector (from which the administrative Prime will be accessed):

```
 Welcome to SFSU Timesharing.
Your terminal is on channel 07/065.

Type Help to get information about logging on,
  or MAINT to see system maintenance schedules.

 Enter class ap
SFSU Prime 9755 -- PRIMOS

Connection complete to channel 03/076.

Login please.

login
User id? david

.....

Disconnected

Welcome to SFSU Timesharing.
Your terminal is on channel 07/065.

Type Help to get information about logging on,
  or MAINT to see system maintenance schedules.

Enter class help
Type one of the following to be connected to a system:

C     or   40    for SFSU Cyber 170/730 instructional
A     or   50    for SFSU Cyber 180/830 administrative
S     or   60    for SCC Cyber 170/760
P                for Instructional Prime
AP               for Administrative Prime
VAX              for Computer Science VAX 11/750 VMS
X                for CSUNET
Help                 for this message
Maint                for Computer Maintenance Schedule

Invalid class. Try again.

Disconnected
```

Clearinghouse names are available to communications server users via the Bridge command *SH CNH,* but may not be accessed via EtherTerm. EtherTerm users may obtain a list of valid clearinghouse names by *DO*ing the macro *NAMES* (ie., *DO NAMES).*

File Transfers

File transfers are supported in Etherterm. By pressing F6, the user can invoke the file transfer menu and use either XMODEM or TEXT file transfers with other systems. Both Cyber systems and Primes have XMODEM file transfer programs installed. This example came from a Cyber. For a dialog with a Prime, the EtherTerm screen would look the same, but the host commands would be different.

```
                    **** FILE TRANSFER ****

 SEND FILE TO HOST
RECEIVE FILE FROM HOST
STOP RECEIVE (TEXT ONLY)

Local file name:                  E:\DAVID\ETERM.DOC
Use Protocol:                     XMODEM

XMODEM and TEXT file transfer:
    End-of-line conversion:       None
    Convert tabs to spaces?       No
    Convert spaces to tabs?       No

TEXT mode packet size (1..100): 10

READ TRANSFER MENU FILE:          default
WRITE TRANSFER MENU FILE:         default
LIST TRANSFER MENU FILES

Start receiving data from the host and save it in the indicated file.

 1HELP 2DO 3CONNECT 4SCRIPT 5CONFIGURE 6TRANSFER 7KEYBOARD 8PRINT 9FILES 10EXIT
```

On the Cyber the user enters commands appropriate to the type of file transfer desired:

```
xmodem
 XMODEM protocol transfer - Version 86337
 Host Send (S) or Receive (R) a file?
? R
 Please enter the file name.
? MYNAME
 Is the file -
   B - Cyber binary
   M - Micro binary
   T - Text -- Display code (upper case only)
   A - Text -- 6/12 Display code ASCII (upper/lower case)
   E - Text -- 8/12 Ascii
   S - Auto-select file type
? M
 Cyber receiving file from micro.
```

Glossary of Data Communications Terms

ADCCP	Advanced Data Communication Control Protocol; the ANSI version of HDLC.
address	the location or station number of a terminal, a peripheral, a node, or some other unit or component of a network.
ALANET	Administrative Local Area Network (at SFSU)
Alias	a name which can be used instead of a user name when connecting to the 3Com network via a name server.
ANSI	American National Standards Institute
APPC	Advanced Program-to-Program Communication; a higher-level SNA protocol using LU6.2
ARP	asynchronous response protocol
ASCII	American National Standard Code for Information Interchange; originally a 7-bit code with 1 parity bit. Defined by ANSI X3.4-1968 as a 7-bit code, but now used as an 8-bit code.
asynchronous protocol	character-oriented transmission in which each character is individually synchronized, usually by means of a start/stop bit.
attenuation	the difference (loss) between transmitted and received power due to transmission loss through equipment, lines, or other communications devices.
attenuator	a device which introduces transmission loss into a circuit. It may be inserted to insert loss, or match impedances.
AUI	attachment unit interface; IEEE 802.3 specifies 50 meter cable between a terminal or repeater and its transceiver. A 4-pair overall shielded cable terminated in male 15-pin D connectors. Pins 3 and 10 transmit data. 5 and 12 receive data, pins 13 and 6 (ground) transceiver power, 2 and 9 collision detection (heartbeat).
bandwidth	the range of frequencies that can be used on a circuit; also used to describe the transmission "power" of a data link.
baseband	a signalling technique in which the signal is transmitted in its original form and not changed by modulation. Ethernet uses baseband.
BDF	building distribution frame; on the SFSU LAN a BDF acts like an extension cord for the Ethernet with multiple connectors being distributed to other floors.
bisynchronous protocol	a half-duplex, character-oriented, synchronous protocol developed by IBM.

BITNET	a mail exchange connecting universities and research laboratories around the world; connected to Cyber Mail.
BNC	a coax cable connector type
bridge	equipment which allows the interconnection of Ethernet networks to other networks, such as X.25, T1 or SNA networks, or even to other Ethernet networks.
broadband	a single channel is divided into a number of other channels of smaller bandwidth via FDM (frequency division multiplexing). Each of these subchannels can carry different kinds of data.
broadcast	the simultaneous transmission of data to a number of stations.
bus	a network topology which functions like a single line which is shared by a number of nodes.
CATV	community antenna television; cable TV which uses coax cable.
CCITT	Consultative Committee International for Telephony and Telegraphy. An august body which, along with IEEE, ANSI, NBS, ISO, ECMA, EIA, and others, determines datacom standards.
CD	on modems CD means "carrier detect"; for LANs it means "collision detection", the ability of a transmitting node to detect a simultaneous transmission by another node.
channel	a path for electrical transmission. Also called a circuit, facility, line, link, path, medium. A channel can also be a specific and discrete bandwidth allocation in the RF spectrum (for example, in a broadband LAN) utilized to transmit one information signal at a time.
CIOSYS	Concurrent Input/Output System; a chunk of 3Com software which functions like a DOS emulation kernel, providing service for concurrent I/O.
circuit	a communications path between two points.
coaxial cable	an electrical cable with a center core (called a conductor), shielding, and another mesh of wire wrapped around the shielding (called the carrier). On the outside of the cable is more shielding and a vapor barrier. Because of the design, coax can support very high data transfer rates.
collision	overlapping transmissions from two devices sharing a channel attempting to use the channel at the same time. Their interference is a collision.
contention	a situation in which two devices would like to use the same channel at the same time.
controller	a device which assembles and disassembles packets and acts as the interface between the computer and transceiver.

CRC	cyclic redundancy check; a way of verifying that data sent was not corrupted enroute. A polynomial expression is used with the numeric value of each byte of data transmitted. A final value is computed and checked against a number which is transmitted along with the data. If the numbers differ, the data is "bad". Usually this function is implemented in hardware, when possible.
CRT	cathode ray tube; a terminal.
CSMA	carrier sense multiple access; a contention technique which allows multiple stations to gain access to a single channel (such as on an Ethernet).
CSMA/CD	CSMA with collision detection; the stations avoid contention by "listening" to the channel (CSMA), but when collisions occur, packets are retransmitted. Randomizing routines are usually used for retransmissions so that stations do not continue retransmitting at the same time ("hallway tango").
datagram	a "one-shot" transmission, much like a telegram, usually with no requirement for acknowledgement.
dB	decibel; the standard unit used to describe the relative strength of two signals.
DCE	data circuit-terminating equipment; network equipment (modems, lines, etc.)
DDN	defense data network
destination	a receiver of data.
Domain	the geographical location or subunit within an organization which is used with a name or alias when connecting with the 3Com network via name service.
download	to send data to another intelligent station; downloading frequently involves either sending a file from one PC to another, or may refer to one machine installing some rudimentary function in another (such as when a server downloads a diskless workstation).
DTE	data terminal equipment; devices which talk to the network (users, computers, terminals, etc.)
EBCDIC	Extended binary coded decimal interchange code; an IBM (mainly) 8-bit code.
ECMA	European Computer Manufacturers Associations
EIA	Electronics Industries Association
EMAIL	electronic mail; there are a variety here: 3+Mail, Cyber Mail, and BITNET.

error detection — a scheme in which data is sent with a numeric code; at the receiving end an algorithm is used to convert the data into a single numeric code, which is checked against the code transmitted with the data. If the codes do not match, an error has been detected.

Ethernet — a baseband local area network specification originally developed by Xerox, Intel, and Digital Equipment Corporation. In its original implementation, coax cable and transceivers were used to connect disparate equipment. The system utilizes baseband transmission at 10 Mbps. The total cable length can be 2.5 kilometers. 1024 nodes can be placed on a network.

F-type connector — a cheap connector used mainly in the television world to connect coax to equipment.

FDM — frequency division multiplexing; the available transmission frequency is divided into subchannels, each of which can be used by single users or groups of users.

fiber optics — light is used as a data transmission medium; glass fibers are not sensitive to electrical interference and can support much greater bandwidth (capacity) than coax.

file server — a network resource which provides shared access to files.

flow control — a method of "throttling" data flow in cases where one device is temporarily unable to receive data, or when two devices operate at different transmission rates.

frame — a synchronous data link transmission unit; in other words, a chunk of data regarded at level 2 of the ISO/OSI Reference model.

gateway — a special node in a network which interfaces to or more dissimilar (or similar) networks, providing protocol translation between the networks.

HDLC — high-level data link control; a bit-oriented synchronous data transmission protocol. Various organizations have defined standards for essentially the same protocol; The ISO's is HDLC; IBM's is SDLC; ADCCP and BDLC are others.

home directory — in 3Com's LAN, the home directory is a directory on a file server which appears to be the root directory of a locally-attached hard disk.

IDF — inter-floor distribution frame.

IDP — Internet Datagram Protocol

IEEE — Institute of Electrical and Electronics Engineers

IEEE 488 — an IEEE standard parallel interface bus consisting of eight bidirectional data lines, eight control lines, eight signal grounds, which provides for connection to an IEEE-488 device.

IEEE 802.3 — IEEE specifications for CSMA/CD

IEEE 802.4 — IEEE specifications for the Token Bus

IEEE 802.5 — IEEE specifications for the Token Ring

Internet — a collection of networks, including Arpanet, NSFnet, and others, which interconnect the military-industrial complex.

IP — Internet protocol.

ISO Reference Model — The famous seven-layer approach to network design, which divides up the total "job" of data transmission into various specifications:

1) **Physical Layer** - the electrical connections between devices. Examples of this kind of specification are RS-232-C (CCITT V.24) and IEEE-488. In terms of most of you who have PCs, your EtherLink board on the PC operates at this level.

2) **Data Link Layer** - how data is moved from point A to point B, and how to deal with errors, etc. An example of this is the HDLC standard. Ethernet is more complicated. With IEEE 802 the data link layer is further subdivided into two sublayers: logical link control (LLC 802.2); and medium access control (MAC). IEEE permits three possible implementations of medium access: CSMA/CD (802.3); Token Bus (802.4); and Token Ring (802.5). Ethernet consists of 802.2 and 802.3.

3) **Network Layer** - even though data can be transferred from A to B, sometimes B is transferring data to A in behalf of C. For this reason the network layer handles the establishment, termination and maintenance of network connections. An example of this is Internet Protocol (IP) for UNIX systems, or XNS for Bridge/3Com systems (which also uses a variant of IP called IDP -Internet Datagram Protocol)

4) **Transport Layer** - concerned with end-to-end data integrity and quality of service. Consider this: when a file is sent from point A to point B, it is broken down into packets which are encapsulated into Data Link frames; the frames are checked by Level 2, and are passed to system buffers. If they are to be passed to another network, Level 3 handles it. By the time Level 4 (this layer) gets the data, it has to begin putting it back together into a file. This layer also does integrity checking. An example of this layer is the Transmission Control Protocol (TCP), an ISO Class 4 transport protocol. 3Com uses XNS, which in turn uses SPP (Sequenced Packet Protocol) at this level.

5) **Session Layer** - standardizes the task of setting up a session and terminating it. This layer deals with the interaction between end-application processes. In your PC, this function is performed by the NETBIOS.

6) **Presentation Layer** - relates to the character set used (EBCDIC, ASCII, etc.), to the way data is displayed on a screen, printer, or other peripherals. In the case of the 3Com network, much of the network is seen as "peripherals" to your PC. Obviously, the standard DOS function calls to perform video, disk, and monitor functions is inadequate for Network I/O. Thus, a chunk of code called the REDIRECTOR intercepts various DOS function calls and maps them to NETBIOS calls.

7) **Application Layer** - deals with application level and O/S functions. This layer can be represented by your application program's interaction with the operating system, MS-DOS 3.1.

ISO/OSI — International Standards Organization; Open Systems Interconnection.

jam — a short encoded sequence emitted by a node to ensure that all other nodes have detected a collision.

KERMIT — a widely-used file transfer protocol used on asynchronous lines.

LAN — local area network; a network located in a localized geographical area (office, campus, research park, etc.) providing high bandwidth and relatively low-cost connections.

long-haul network — like a WAN

loss — signal degradation

LU6.2 — logical unit 6.2; a new breed of logical units in IBM's SNA. These logical units represent intelligent programs which can initiate conversations with other intelligent programs and communicate as peers. The use of LU6.2 implies SNA protocols and SDLC, but no longer absolutely requires the participation of an IBM mainframe or communications processor to manage conversations between logical units.

modem — a word made up of "modulation" and "de-modulation"; specifically, a technique for transforming digital data into analog signals, transmitting them, then transforming the analog signals back into digital data.

MPR — multi-port repeater

MPX — multi-port transceiver

MS-DOS — a PC operating system for PC clones.

multi-cast — broadcast to more than one node

multi-drop circuit — a circuit from device A to device B, with other devices attached along the way.

multi-port repeater — a repeater which allows a signal to be forwarded to more than one location. We have several of these in our network.

multiplex — the use of a common physical channel in order to make two or more logical channels, either by splitting of the frequency band transmitted by the common channel into narrower bands (frequency-division multiplexing); or by allotting this common channel in time slices (time-division multiplexing).

Name — the name of the user gaining access to the 3Com network via the name server.

name server — a server which maintains a list of users of the network and provides access to them.

NBS — National Bureau of Standards (US organization)

NETBIOS — Network Basic Input/Output System; session layer services intended to operate in a network environment. Generally, these are implemented in smart boards which are installed in PCs. Functions are "triggered" by extended DOS function calls. Normally, DOS 3.1 is required to support NETBIOS.

network address — a number or character string which corresponds to a physical location of computer equipment on a network.

node — a station on a network.

octet — a grouping of 8 bits; EBCDIC and ASCII both deal with groupings of 8 bits. There are data encoding schemes like Baudot (5) and Field-data (6) which use less.

Organization — the name of the organization or department given along with a name or alias when accessing the 3Com network via name service.

OSI — Open Systems Interconnection

PABX — private automatic branch exchange; equipment originally used as a means of switching telephone calls at a business site, but now capable of transmitting low-speed data as well. Sometimes called a PBX.

packet — a collection of bits containing control information and data; may be either fixed format or variable length. Packet is often used to describe transmission units at higher levels of the ISO/OSI model, while "frame" is often used to describe transmission units at the data link level.

PAD — packet assembler and disassembler; a device used on an X.25 network for assembling packets of data going into the network, or for disassembling packets flowing out of the network. A PAD can be regarded as a protocol converter. There are a variety of PADs for converting asynch, 3270, Ethernet, etc. packets to X.25 and visa-versa.

parallel interface — an interface which permits parallel transmission, or simultaneous transmission of all the bits making up a character or byte, either over separate channels or on different carrier frequencies of the same channel.

PC-DOS	an operating system used on IBM PCs only.
PDN	public data network
point-to-point	refers to a circuit connecting one station with another (not multi-drop), or to the protocol used in this manner.
polling	a method of controlling the sequence of transmission by devices on a multi-point line by requiring each device to wait until the controlling processor requests it to transmit.
port	the entrance or physical access point to a computer, multiplexor, device, or network where signals may be supplied, extracted, or observed.
port selector	a device which enables a connected terminal to make a connection to one of a number of (also connected) host computers. The port selector first greets the terminal user with a menu of available host computers; after one is selected, a connection is made to the host, and data traffic can flow from the terminal to the host selected.
preamble	a sequence of encoded bits which is transmitted before each frame to allow synchronization of clocks and other circuitry at other sites on the channel. Ethernet has a 64-bit preamble.
protocol	a set of rules and conventions governing the orderly and meaningful exchange of data among communicating parties. Both hardware and software protocols have been defined.
protocol converter	a device which translates the protocol used with one device or network to that used by another. For example, protocol converters permit "dumb" terminals to appear like 327X devices on SNA networks.
REDIRECTOR	a chunk of code in a PC which intercepts BIOS calls destined for MS-DOS and redirects them to the NETBIOS if the applications program is operating in a network.
remote station	data communications equipment operating at a distant location.
repeater	device used to interconnect Ethernet segments. Repeater functions include recovery of timing information, regeneration of data, re-transmission of data packets between segments, and automatic partitioning and reconnection of the network in the event of a segment failure.
RG-58	a type of coax cable.
ring	a network topology in which stations are connected to one another in a circle. Typically, polling or a token is used to control access to the circuit.

rotary — a device used with phone lines to permit a small number of phone lines to make a larger number of connections. One-to-one links do not have to exist between the phone line and devices attached. Typically, a group of (say) 24 phone lines may be connected to a rotary which can attach a line to one of (say) 12 modems. If a modem is unavailable, a busy signal is generated.

router — an intelligent repeater which looks at the higher-level protocol carried in the Ethernet frames and may or may not forward them. For example, if data on an Ethernet carries "local" addresses, it is unnecessary - and can degrade performance elsewhere - to forward the data to the outside world. Some routers can do "adaptive" routing - sending frames via different routes, depending on accessibility of paths and even taking the load into consideration.

RS-232-C — an EIA technical specification (physical layer) which defines a 25-pin interface between DTEs and DCEs, providing for up to 20 functions in full or half-duplex mode at speeds up to 20 Kbps.

SDLC — synchronous data link control; an IBM version of HDLC.

segment — section of the Ethernet system consisting of an Ethernet cable of a maximum length of 500 meters. Up to 5 of these segments can be attached to each other using repeaters.

serial interface — an interface which requires the serial (one-at-a-time) transmission of bits of data.

server — a processor which provides a specific service to the network. Examples of servers are:

1) routing server - connects nodes and networks of like architecture.
2) gateway server - connects nodes and networks of different architecture by performing protocol conversion.
3) terminal server - connects terminals to the network
4) printer server - makes printers available to the network
5) communications server - provides access to various kinds of communications lines, modems, devices
6) file server - maintains files for computers on the network

SNA — Systems Network Architecture; IBM's mainframe network architecture.

SPP — Sequenced Packet Protocol

SQE — a heartbeat signal sent from the transceiver to the terminal via the AUI cable each time a packet goes out so that the DTE knows that the transceiver is functioning properly.

star — a network topology consisting of one central node with point-to-point links to several other nodes. Control of the network is usually located in the central node.

station — a network node

subchannel — a frequency subdivision created from the capacity of one physical channel by broadband LAN technology.

tap — a connector which attaches a transceiver to a cable.

TCP — Transmission Control Program

TCP/IP — Transmission Control Program with Internet Protocol

TDM — time division multiplexing; a method of utilizing channel capacity efficiently in which each node is allotted a small time interval, in turns, during which it may transmit a message (or part of one). Nodes are given unique time slots during which they have exclusive command of the channel. The messages of many nodes are interleaved for transmission and then demultiplexed into their proper order at the receiving end.

TDR — time domain reflectometry; a tool for locating "breaks" in Ethernet cable.

terminator — a resistive connector used to terminate the end of a cable or an unused tap into its characteristic impedance. The terminator prevents interference-causing signal reflections.

Thick-Net — the thicker coax cable

Thin-Net — the thinner coax cable used in Ethernet

throughput — the total useful information processed during a specified time period; usually expressed in bits/second or packets/second.

TNC — a coax cable connector type

token bus — a token access procedure used with broadcast topology or network.

Token Ring — a token access procedure used on a network with a sequential or ring topology. Although IBM's Token Ring uses similar technology to 3Com's, the IBM implementation of token ring runs at 4 Mbps (compared to 3Com's 10 Mbps).

topology — simply, the configuration of a network. There are several kinds of network topology:

1) bus
2) ring
3) star
4) tree

transceiver	a device required in baseband networks which takes the digital signal from a computer or terminal and imposes it on the baseband medium. The transceiver performs the functions of sending or receiving data, detecting data collisions on the network, protecting the network from data packets that are too long, and heartbeat signal (SQE) generation.
UNIX	a widely-used operating system
V.35	an electrical standard for physical connections.
virtual circuit	a term used originally in X.25 to describe an established data path; a "virtual" circuit is carried within a physical circuit.
WAN	a wide area network; a network not confined to a campus or building complex, but possibly encompassing several interconnected LANs via high-speed data links.
X.25	a CCITT standard which defines the interface between a PDN and a packet-mode user device (DTE); also defines the services that these user devices can expect from the X.25 PDN including the ability to establish virtual circuits through a PDN to another user device, and to destroy the virtual circuit when through.
X.28	defines the interface between PADs and non packet-mode DTEs.
X.29	defines the interface between PADs and packet-mode DTEs or other PADs.
X.3	describes the functions of the PAD and the various parameters which can be used to specify its mode of operation.
X.400	a CCITT standard for electronic mail; if everyone used it, all mail systems could communicate. They don't!
XMODEM	a widely-used file transfer protocol used on asynchronous lines.
XNS	Xerox Network System; a high-performance inter-networking protocol. In the public domain since 1981. Nonstandard: Bridge Communications' version of XNS will not talk to Ungermann-Bass', for example.

Specific Equipment in use at SFSU

3Com servers	include file servers, communications servers, name servers, etc. See the definition of "server" in the preceding section. A 3Com product.
3+Mac	a software package from 3Com which permits Macintosh computers to communicate with a 3Com network as well as with Appleshare.
3+Plus	3Com networking software
Apple 2e's	older Apple computers; not compatible with the newer Macintoshes.
CS/1	communications server; provides Ethernet connectivity for asynch, bisync, SNA, or X.25 devices. A Bridge Communications product.
CS/100	communications server; a low-cost version of the CS/1, with less power and not supporting X.25 or SNA devices. A Bridge Communications product.
CS/200	communications server; this device cannot auto-load and must be loaded from a network control device. It supports a small number of RS-232-C ports. A Bridge Communications product.
Cyber 730	a host computer on campus. A Control Data product.
Cyber 830	a host computer on campus. A Control Data product.
dumb terminals	asynchronous terminals without buffering on-board processing capabilities, or the ability to emulate other devices. Typical examples of "dumb" terminals include ADM 3As, teletypes, older glass terminals.
EtherTerm	a software package which can be run with 3Com software, providing access to communications servers elsewhere on the network; users will not have to have their own modem and communications software: they can share. A Bridge Communications product.
fiber optic links	much of the campus is wired with fiber optic cable instead of coax.
FX	fiber optics
GS/1	gateway - interconnects multiple Ethernets over X.25 or public data networks; supports XNS protocols. A Bridge Communications product.
GS/1-X.25	gateway - provides support for up to 8 X.25 hosts, connecting X.25 networks to Ethernet networks. A Bridge Communications product.
GS/3	router - interconnects up to 9 Ethernets over point-to-point communications links; can perform adaptive routing, load balancing, and operate on fiberoptic, dedicated line, or broadband. A Bridge Communications product.
GS/3-IP	a router. A Bridge Communications product.

IB/1	internetwork bridge - interconnects a standard Ethernet to a 5 Mbps Bridge broadband network. A Bridge Communications product.
IBM-compatible PCs	Zeniths, Suns, Compaqs, etc.
LS/1	communications server - supports up to 64 RS-232-C devices (printers, modems, etc.)
Macintosh PCs	Macs, Mac+, Mac SEs
Micom port selector	a device which can link up to 1000 terminals with several networks and 4 hosts on campus. A user first establishes a connection with the port selector, is presented with a menu, and can then select a further connection with one of the hosts.
modems	modulator/de-modulators; devices which turn digital data into analog signals which can be sent over phone lines.
MPR	multi-point repeater
MPX	multi-point transceiver
NCS/1	a Network Management Workstation; really a Sun Microsystems Unix 4.2 system with proprietary software for controlling the Ethernet network.
NCS/150	an older version of the NCS/1.
network printers	a variety of work-horse, laser, and mid-range printers.
Prime 9755	a host computer on campus
Prime 9955	a host computer on campus
protocol converter	a device which allows a "dumb" terminal to communicate with a host which expects to talk with a more intelligent device
repeaters	a device which forwards Ethernet frames, boosting their signal
SFSU library	the library will eventually have public access to its circulation system via the LAN
X.25 private network	the university has an internal X.25 network connecting Sacramento and Los Angeles campuses. Other campuses connect to the three nodes of this network.
XNS router	a router which understands XNS protocol.

Suggested Reading

Some of the references here are a bit technical, but most are highly readable:

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Pickholtz, Raymond L., ed., Local Area and Multiple Access Networks, Computer Science Press, 1986.

Comments, Please...

Please give us your feedback on this document so that it can be improved to help people use the SFSU network facilities.

Send via Campus Mail to: Network Support, Computing Services

Hello,

This is a proposal to install an Active Conversational Network on the campus computer system. This would be a general access network accessible from any of the computer labs on campus. The network is designed to provide an environment for students and faculty from diverse backgrounds to exchange ideas. It should aid in the conception, organization, and development of inter-disciplinary research projects and productions.

Presently we are trying to measure the level of interest there is in participating in a network such as this. Please take some time to read over the proposal and respond to the questionnaire. If you have any questions or are interested in getting involved in putting this project together feel free to contact me. Thank you for your time.

Sincerely,

Todd V. Erickson
Graduate Student
Inter-Arts Center
(415) 681-7025

CREATING AN ACTIVE CONVERSATIONAL NETWORK: A PROPOSAL

Todd V. Erickson

Abstract- Inspired by the new order of dynamic relationships now coming in to play via the use of computer networking; and, searching for a way to capitalize on the multi-disiplinary intellectual force present at the university; I propose to acquire software designed to aid in the conception, organization, and development of inter-disciplinary research projects and productions. This software would run on the campus computer network.

Challenge in the Information Age

There is a tremendous challenge being put to today's institutions of higher education. "Universities and colleges worldwide are facing the 'Crisis of Adjustment'. Primarily trapped by outdated bureaucracy, rising costs, and declining prestige, many universities are struggling to redefine their place in the modern society called the Information Society."[1] Educational institutions must evolve in response to socially defined priorities. The challenge is put to all as the seriousness of the issues that face us get ever more complex. Former Secretary General for the United Nations, U Thant, makes it clear just how serious and complex this challenge is.

> The inevitability of the development of the first global civilization and the necessity for its conscious, directed growth has not yet been grasped or sufficiently appreciated to provide the motive power for the great advances which mankind must take in the very near future or parish - if not with the "bang" of a nuclear holocaust, then with the "whimper" of a species and a civilization which ran out of air, water, resources, and food.[2]

Given the complex web of inter-connected institutions that make up societies, both local and global, it seems only logical that educational institutions capitalize on the diversity of the university. The university is variously composed of departments, centers, and focus groups investigating specific fields of interest. It is only through the process of conversation that these specializations can begin to address the larger issues that effect us all. "We are at a time when creative conversations are essential on a massive scale for human dignity and survival".[3]

It is necessary to come together and make proposals for ways to act on our awarenesses. The computer network is a linkage, storage, and access device open to the creative abilities of its users.

Community Memory in Education

In my search for available software that would aid in the organization of multi-disciplinary forces, I've come across Community Memory in Berkeley, California. Community Memory is a system for the public management of public information. "Their most obvious goal is to demonstrate that computer information systems can be built that will help people to meet other people with similar interests."[4]

Its operation is simple and effective. All the information in the Community Memory is put in directly by the people who use the system. "Anyone can post messages, read any of the other communications that are there, and add comments or suggestions at any time."[5] When a message is entered the author has the opportunity to file the message in any number of existing files that the message may pertain to or, to create new files. Students can enter anything; from, information about the latest advancements in computer science, to expressing a desire to collaborate on a film project. One might enter

information about a pressing ecological issue and ask others to contribute related data. This process of posting messages, awarenesses, and ideas; making them available for comment and criticism, opens up the possibilities for a rich discourse.

With the systems most recent upgrade, (to be installed in Oct. of 1988), individuals are given the opportunity to pull excerpts from various files, creating a forum. For example you can pull information from files on Information, New Technologies, and Inter-disciplinary Studies and create a Forum called Inter-disciplinary Educational Tools. Again, users would be able to add comments , criticism, and suggestions to this Forum. Forums allow users to synthesize data and concepts from various inter-related points of view.

Another new feature to the Community Memory allows for the author of a message to tell others about their backround, list areas of interest, or special skills they've developed. These two features help to organize users with specific interests and skills around a larger issue to which each can contribute their best.

Inter-Disciplinary Action

After considerable discourse, it is likely that certain needs will become apparent; issues will beg to be dealt with. It will take the intelligent cooperation of many individual groups to propose actions to meet these needs. One addition I would make to the Community Memory software would be a database that would store proposals for further research and calls to production. This would provide an incentive for users to develop ways to deal with complex issues. For example, a Forum on The Deterioration of the Biosphere, could lead to a proposal for The Development of Alternative Energy Sources. This

would call for a cooperative effort from individuals from various disciplines to handle the different aspects of this undertaking. These proposals should lead to further discussion and meetings outside the network. "Proposing possible solutions is a very useful intellectual technique for dealing with problems. It provides a focus for observation, analysis, and search for data."[6] Through these connections many products and services could be developed, from educational materials to artworks.

In our university lies a rich ground for discourse. It's been said that the whole world is represented at San Francisco State University. Through computer aided conversations and organization, we can act with a greater understanding. "The goal of understanding is not purely intellectual. It is rather to provide the intellectual underpinning for responsible action."[7]

Next Step

I'm looking for support and participation on many levels. If you are knowledgeable or have an interest in computer networks, software design, databases, or inter-disciplinary projects, please contact me.

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1. Indu B. Singh "Universities in the Information Age: Leaders or Laggers?", Telematics and Informatics, Vol. 5, No. 1, 1988, p.3.
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6. Stephen Viederman, "Population Education in Elementary and Secondary Schools in the United States", in Aspects of Population Growth Policy, P. 455.
7. Willard J. Jacobson, in Population Education a Knowledge Base, Teachers College Press, 1979, p.11.

Questionnaire

This is a questionnaire designed to measure your interest in being an active participant in the Conversational Network described in the attached proposal. The network is designed to provide an environment for students and faculty from diverse backgrounds to exchange ideas. It should aid in the conception, organization, and development of inter-disciplinary research projects and productions. Please take some time to respond to the questions and make comments.

Personal Data

Name Jennifer Swan

Phone Number 923-0900

Position (Faculty, Student, ect.) student

Department IAC

---

1. How, if at all , do you presently use the campus computer facilities? word processing, graphics,

2. How Much of an interest do you have in exchanging ideas with others on campus? very -- this sounds exciting -- we need this type of communication.

3. **What kind of benefit do you see coming from the interaction of individuals from different disciplines?**

A stronger sense of each discipline and the entire university itself. The interaction between departments would be a great experience!

4. **What issues would you like to see addressed on the network by the university at large?**

- Environmental issues on campus (styrofoam etc.)

5. **What skills, information, or resources do you have to share?**

- computer network knowledge.
- word processing

6. **Would you be interested in contributing your skills to a project being developed through the network if it dealt with issues you felt strongly about?**

7. **How do you think this involvement could apply to your academic program?**

Please make any additional comments on this page.

Thank you for taking the time to respond to this questionnaire. When you have completed it return it to your professor.

Notes - 10/27/88
Meeting w/ Todd

Recover marginal costs $4-10K

Ongoing support ——— Questionaire

What community is being served / what does it facilitate

What's in it for us? (eg possible P.R.) — No specific plans; supports general idea of promotion

Are terminals available to all students? — yes

~~Dec may show up~~

Run on their machines? Do they have Unix Sys V

Tool for students to use to work w/ others outside their discipline

Add way to make proposals

- could be just a forum, but structure should in some way lead people to <u>action outside the system.</u>

Steps:

- Get more tech. info from us
- Propose to computer center (a manager ~~Thomas~~ Lovell ~~Dec~~ ~~Hawk~~ John Lyaconna there is into it + will help w/ proposal)
- They should install (+ maintain) it?
- Cost:
  - paid by computer center?
  - " " departments?

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