SEP computer update

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ABSTRACT

During the past six months we added substantial amounts of new hardware and software to the SEP computer center. This includes (1) a seven Sun network, (2) the Merlin SKS and CogniSeis DISCO seismic processing systems, (3) increased Convex capacity, and (4) more interactive graphics software.

Workstation network

We decided to put a seismic movie machine on every SEP researcher's desk. Any additional computational capacity is welcome. Sun Microsystem workstations fit our needs and budget, so we added six diskless 3-110s and a file server to our 3-160.

SEP is part of a local network made up of all the earth science computers (Table 1). All computers (except one) run UNIX and connect to the Ethernet.

We have three methods of sharing resources across the network. Resources include disk files, processors, tape drives, graphics terminals, printers and communications. The first method are the standard UNIX network utilities such as *remote*login, *remotecopy*, *remoteshell*, etc. The second method is Sun Microsystem's Network File System [NFS]. NFS is on our Suns and VAXes and probably everything else by the end of this year. The third method is the network graphics system called X-Windows from MIT. We are writing applications programs which run on more than one computer simultaneously to take advantage of the strengths of each computer. This is discussed in the article "Multi-computer seismic programs" elsewhere in this SEP volume.

Merlin SKS and CogniSeis DISCO

Both systems were installed on the Convex in early 1987. We expect many people to use these commercial systems for the routine field data processing and eventually incorporate their thesis algorithms. SKS seems more popular for new algorithm development and plotting, while DISCO is useful for compatibility with the USGS and Berkeley.

TABLE 1: EARTH SCIENCE COMPUTER NETWORK (4/87)

LAB/MODEL	*MIPS*	*CORE*	*DISK*	*NAME*
GEOPHYSICS				
Reflection Seismology (Claerbout)				
Convex CXP	40	64	3960	hanauma
Microvax II	.9	11	71	mazama
SUN 3/160	2	16	717	taal
SUN 3/110	2	8	0	huoshan
SUN 3/110	2	4	0	destijl
SUN 3/110	2	4	0	vostok
SUN 3/110	2	4	0	canopus
SUN 3/110	2	4	0	qatif
SUN 3/110	2	4	0	katahdin
Departmental/Dean's Office				
VAX 11-750	.7	5	1212	erebus
Refraction Seismology (Thompson)				
Microvax II	.9	3	511	mammoth
Borehole Seismology (Zoback)				
Masscomp	.8	4	550	loihi
Paleomagnetism (McWilliams)				
IBM RT	1	3	80	haruna
Seismology (Yomogida)				
SUN 3/260	4	16	260	olympus
PETROLEUM ENGINEERING				
Departmental				
VAX 11-750	.7	6	952	ararat
IBM RT	1	3	80	maltebrun
Sohio Project (Aziz)				
Apollo 660	1	4	186	thera
APPLIED EARTH SCIENCES				
Geomathematics (Harbaugh)				
Gould 9080	12	16	2700	summit
Geomechanics (Pollard)				
IBM RT	1	3	80	
Geostatistics (Journel)				
IBM RT	1	3	80	
Hydrology (Remson)				
IBM RT	1	3	80	
Remote Sensing (Lyon)				
IBM RT	1	3	80	
GEOLOGY				
Geology/AES/Departmental				
VAX 11-750	.7	5	968	denali
Geochemistry (Bird)				
IBM RT	1	3	80	hekla
SCHOOL OF EARTH SCIENCES				
Developmental System (Farrell)				
IBM RT	1	3	80	toiyabe

Convex upgrades

We increased the scalar speed of our Convex 50%, added 16MB of core memory for a total of 64MB, added a second tape drive and 36" plotter. Software additions include SKS, DISCO, veclib math library, and X-Windows network graphics system. Table 2 lists the major applications software on our computers.

TABLE 2: MAJOR SEP APPLICATIONS SOFTWARE (4/87)		*SOURCE*
Seplib	UNIX based data cube processing kernal	SEP
SKS	production seismic processing	Merlin
DISCO	production seismic processing	CogniSeis-CSD
Segy	seismic processing library using SEGY headers	Utah, SEP
Sioseis	Scripps seismic processing package for teaching	Scripps
SOLID	seismic modeling	GDC
Seis83	seismic modeling (ray tracing)	Cerveny
AIMS	seismic modeling (ray tracing)	GeoQuest
Movie	fast interactive display of seismic raster cubes	SEP
Overlay	moveout and multiple templates on seismic data	SEP
Breakout	interactive cube dissection	SEP
Vplot	device independent vector graphics	SEP
Tiplot	print seismograms on a laser printer	SEP
X-Windows	interactive bitmap window graphics	MIT
Sunview	interactive bitmap window graphics	Sun
Smalltalk	object-oriented graphics environment	Xerox
TeX	typesetting including tables and math	Stanford
Troff	UNIX typesetting including tables and math	AT&T
Writer's Workbench	proof reading utilities	AT&T
Macsyma	symbolic algebra solver	Symbolics
Linpack, Eispack	numerical libraries	ACM
Matlab, Veclib	array processing libraries	Stanford, Convex
Emycin, MRS	expert system shells	Stanford

Interactive graphics

The Sun workstation continues to be the focus of interactive graphics development. We are concentrating our applications developments under Sunview (Sun interactive bitmap windows), X-Windows (MIT network interactive bitmap windows), and vplot (SEP machine independent plot language). One goal is interactive seismic processing using

both Suns and the Convex.

We currently distribute four unsupported graphics codes as examples of Sun programs outside of SEP. These include *Overlay*— an interactive velocity and multiples data template program, *Movie*— SEP seismic movie program, *Breakout*— a seismic cube dissection program, and *Spen*— a SEP vector graphics utility. The source codes include the seplib (Claerbout, 1987) and septool (Ottolini, 1986) utilities.

Table 3 is a compilation of the most recent raster graphics speed measurements. We find the speed of putting a raster image on a terminal screen to be an indicator of how well our seismic graphics software will perform.

TABLE 3: RASTER DEVICE SPEEDS (4/87)

WORKSTATION	*SOFTWARE*	*PIXELS/SECOND*
SUN III-260	UNIX/pixrect	2,200,000
SUN III-160,110	UNIX/pixrect	1,400,000
Masscomp 5700 Aurora	UNIX/mclib	1,100,000
VAX-II monochrome	Ultrix/ioctl	430,000
VAX-II GPX	VMS/UIS	410,000
Sun III-160	UNIX/X-Windows	410,000
VAX-II AED	Ultrix/SEP driver	300,000
VAX-780 AED	UNIX/SEP driver	300,000
Convex-Raster Tech	UNIX/Convex driver	200,000
Convex-Sun	UNIX/X-Windows	140,000
VAX-II monochrome	VMS/UIS	130,000
VAX-II GPX	Ultrix/X-Windows	100,000
Ethernet	UNIX TCP/IP	50,000

Wish list

Our top hardware desire is enough file storage to keep our favorite datasets online. We expect terrabyte optical disks may meet our need.

Our top software needs are better tools for writing interactive seismic graphics code. We need something that runs on all our graphics terminals and a toolkit of convenient building blocks.

REFERENCES

Claerbout, J.F., 1986, A canonical program library: SEP-50, p. 281-290

Ottolini, R., 1986, Comments on hyperbola overlay program development: SEP-50, p. 279

Ottolini, R., 1987, Multi-computer seismic programs: SEP-51

CONVEX 10/1/86

USER	CPU MIN
pete	84334
chuck	23680
kamal	23089
stew	19034
paul	18957
marta	14166
daemon	11399
rick	8406
biondo	7006
li	6667
john	6593
clem	6416
jon	4258
jos	3969
joe	2783
francis	1846
dan	1449
harb	1309
craig	1185
hansen	888
shuki	520
bill	404
jill	319
jensen	250
erik	239
andy	154
kita	148
pat	121
barton	87
kellie	71
wang	63
colleen	60
howie	59
kang	55
okaya	52
alabert	50
haken	45
etgen	44
trier	43
schapper	42
hicks	41
hollis	36
jackson	36
prof	33
finstuen	32
reck	31
ramos	27
steve	19
jeremy	19
karish	10
ta	9
einar	8
mann	7
bob	6
fabio	6