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WORKSTATION SELECTION STATUS REPORT

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LAPP

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1- Introduction

This note described the possible choice of workstation to be used as standard workstation for the control of Virgo. About 20 workstations are foreseen(see Final Design). Though each of them will be assign to a given subsystem they will be able to run any software in order to provide redundancy and additional computing power if one subsystem need more computing resources. We will therefore select workstation of the same type organized in a set of two clusters with common disk space and additional hardware not described in this note.
The workstations will be used to run the graphical user interfaces of the different subsystems. This could be simple panel or more demanding graphic like for imaging, transfer function computation, histograming. They will be used as well for the software development performed on site for a given subsystem, and specific study like simulation to understand the behavior of one subsystem. They will also provide the computing resources to run the X terminal distributed of the Virgo buildings to control the experiments which means that there could be a few additional users connected on these stations. To meet these goals, foreseen the computing request of the next 4 to 5 years and optimize the ratio cost/performances we search for 'mid-range' workstations.

2- First selection

At the virgo meeting in Annecy in June 1996 ,I have presented (see annex 1) the principals computers vendors normally used in the laboratories which are DEC, HP,IBM, SGI, SUN. Independently of the CPU power available the processors are summarized bellow:

DEC processor ALPHA 21064 (v4 version of the chip) -64 bits
ALPHA 21164 (v5 version)

HP processor PA-7200 -32 bits
PA-8000 -64 bits

IBM processor Power 2 -32bits

SGI MIPS 5000 processor 64 bits
MIPS 10000 processor 64 bits

SUN Ultra SPARC processor 64 bits.

The following selection criteria were defined in April 96 (PISA Meeting)

Unix SYSTEM
64 bit processor
high compute performance
best price/performance ratio

maintenance in good conditions
knowledge in virgo labs

If we apply the two first criteria, the computers based on HP PA-7200 and IBM processors are eliminated. The AXIL - a sparc clone - is also rejected due to poor performances and maintenance considerations. The DEC alpha 21064 will be soon out of distribution list and therefore is also removed. Finally, the SGI mips 5000 is not retained in terms of performance.

So, now the choice is between:

- Dec alpha 21164 serie 500 or 600
- HP PA-8000 , c160, c180 models
- SGI mips 10000 serie
- SUN Ultra Sparc I or II, 170 or 200 Mhz models

Their main performances are listed in the next table:

Processor	type	clock (MHz)	spec95-int	spec95-fp	Xmarks	Reduced price kF
ALPHA (500)	21164	266	7.4	10	28.86	116400
		333	9.2	13.6	32.43	140500
		400	11	14.1	36.2	174600
		500	15.0	19.5	NA	
PA-RISC	8000	160	10.4	16.3	34.5	150000
		180	11.8	17.5		>170000
MIPS	10000	200	8.9	12.5	NA	165700
Ultra Sparc	Ultra 1/2	170	6.26	9.06		125700
		200	7.67	11.1		145500

From general computing considerations we have define a standard hardware configuration used in the above table for every machine. The size of the central memory is choose to be 128 Mo because the memory is in general the first bottleneck encountered. The disk capacity required is small ,only 2 Go for swapping and a small scratch area. It seems normal to have a good color screen for all the controls (20 " color screen of 1280*1024pixels resolution). A cddi interface for the network is included, as well as a UNIX system distribution on CD ROM and the minimum C ANSI and C++ compilers and libraries

The prices indicated include hardware+software configuration and except for HP and SGI an extension of guaranty on site for 3 years. This can be separated in the final discussion.

3- Discussion

Now if we consider the price for these typically configurations, the SGI Mips 10000, the DEC models 600 or 500/500 and the HP C180 have prices out of the order of 150kFF/station planed in the VIRGO FINAL DESIGN BOOK - 1995 version.

So with the above considerations , we can reduce for this step our choice to:

- HP PA 8000 models C160
- SUN Ultra 1 or 2
- Dec alpha serie 500

The different vendors have not the same policy for the distribution. For HP and SUN we have to buy the compilers and the tools which are not comprised in the system. DEC for Research and Education has a special contract known as DECCAMPUS. All the software distributed in deccampus CD-ROM are free.

DEC offers a more complete list of models, and the evolution with the same processor is not limited for several years.

In terms of CPU performance , the superscalarity of Ultra Sparc is of 4 instructions level instead of 6 or 8 for the others. this fact explains the lower CPU performance for the ultra sparc.

In DEC list ,the model 500/500 was just announced, and certainly the model 500/266 will be disappeared in the next price list.

The C160 HP model has better performance than DEC 500/333 but a higher price and we have not obtain the maintenance conditions for Italy. This may be indicated some difficulty between HP-FRANCE and HP ITALY.

If we compare announced performances in terms of SPEC , the sun ultra 2/200 model has lowest performance but highest price than DEC model 500/333. This model seems to be a good choice for the moment and certainly we can discuss with DEC for a special discount to reduce this price based on a one station offer and we have not discuss the conditions for 10 stations at a time.

DEC stations are not dedicated to UNIX system. They also support NT and this is a possible evolution for the future.

The last and important point is that the complete <u>64 bits</u> UNIX system exits since 3 years for digital UNIX not only for CPU operations but also for file system and management. This is not the case for SUN and HP who just move to 64 bits.

4- Recommendation

If we are considering all the points, at the present time, I think that the better choice is a DEC alpha 500/ 333

Annexe 1:

Vendor	CPU type	Model	bits	performance				price / FF	%	knowledge	comments	delay
				SPEC						in labs		
				int92	fp92	int95	fp95					
DEC	**alpha 21164**	**500/333**	**64**	**389**	**480**	**8.6**	**12**	**127,9**	**20%**	**Lal,Lapp,Napoli**	**Digital unix**	3-4 weeks
DEC	**alpha 21164**	**600/266**	**64**	**329**	**429**	**7.29**	**10.5**	**175**	**20%**		**id**	3-4 weeks
DEC	**alpha 21164**	**600/333**	**64**	**412**	**546**	**9.19**	**13.6**	**159,8**	**20%**		**id**	3-4 weeks
HP	7200	C100	32	140	224				30%	lal,lapp,	HP-UX (32bits)	3-4 weeks
HP	**8000**	**C160**	**64**	**400**	**600**	**9.5**	**17.5**	**150,00**	**30%**	**annoucement**	**HP-UX 10.20**	7200 upgrade
IBM	power2	3CT	32	130	266	3.42	10.2	148,00	40%	Pise	AIX 4.2	
SGI	**mips/200**	**10000**	**64**	**300**	**600**	**8.9**	**12.5**	**165,70**	**35%**		**IRIX 5.3**	3 weeks
SGI	**mips/180**	**5000 SC**	**64**			**4.1**	**4.4**		**35%**		**id**	3 weeks
SUN	**ultra sparc**	**1/170**	**64**	**250**	**351**	**6.26**	**9.06**	**115,50**	**30%**	**none**	**solaris 2.5**	
AXIL	**ultra sparc**	**1/143**	**64**	**215**	**303**			**79,70**	**35%**		**id (clone)**	4 weeks
DEC	**alpha 21164**	**10004/266**	**64**	**197.5**	**263**			**97,20**	**20%**			3-4 weeks

PRICES ARE GIVEN FOR A CONFIGURATION OF 64MO, 2 GO SCSI DISK, 20" COLOR MONITOR, 2D GRAPHICAL INTERFACE