Consolidated Management Report

2nd Quarter 1999

CfS/MB/P/99/10

CSAR Service

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Management Summary

The system is the flagship HPC facility for UK Academia and Industry, enabling them to continue their World Class research and development.

In this the second quarter of production service the CSAR systems have again performed well against the CPARS measures of service quality.

The number of users has grown from 242 up to 319. As a percentage, usage by NERC projects has grown at the fastest rate. PPARC has also commenced usage of the system.

Average job wait times have in general been acceptable throughout the quarterly period. There has been increased throughput of both larger jobs and interactive work on the Turing system. The Fujitsu system has been been particularly heavily loaded.

Increased resource control for PI's has been enabled by the introduction of sub-project management tools, and the Capacity Planning facilities are now in effective use.

Finally, the Capacity Planning facilities now clearly show that additional PEs will be needed on the Turing system to meet both the existing demand and that of new projects.

Introduction

This Management Report includes a section for each of the main service functions:

1. Service Quality
2. HPC Services
3. Science Applications Support Services
4. Training & Education Services
5. User Registration & New User Services
6. Value-Added Services

Each section includes a status report for the period, including notable achievements and problems,and noteworthy items for the next period.

1.   Service Quality

This section covers overall Customer Performance Assessment Ratings (CPARS), HPC System availability and usage, Service Quality Tokens & other information concerning issues, progress and plans for the CSAR Service.

1.1   CPARS

Table 1 gives the measure by which the quality of the CSAR Service is judged. It identifies the metrics and performance targets, with colour coding so that different levels of achievement against targets can be readily identified. Unsatisfactory actual performance will trigger corrective action.

CSAR Service - Service Quality Report - Performance Targets

Service Quality Measure	Performance Targets					
	White	Blue	Green	Yellow	Orange	Red
HPC Services Availability						
Availability in Core Time (% of time)	> 99.9%	> 99.5%	> 99.2%	> 98.5%	> 95%	95% or less
Availability out of Core Time (% of time)	> 99.8%	> 99.5%	> 99.2%	> 98.5%	> 95%	95% or less
Number of Failures in month	0	1	2 to 3	4	5	> 5
Mean Time between failures in 52 week rolling period (hours)	>750	>500	>300	>200	>150	otherwise
Help Desk						
Non In-depth Queries - Maximum Time to resolve 50% of all queries (working days)	< 1/4	< 1/2	< 1	< 2	< 4	4 or more
Non In-depth Queries - Maximum Time to resolve 95% of all queries (working days)	< 1/2	< 1	< 2	< 3	< 5	5 or more
Administrative Queries - Maximum Time to resolve 95% of all queries (working days)	< 1/2	< 1	< 2	< 3	< 5	5 or more
Help Desk Telephone - % of calls answered within 2 minutes	>98%	> 95%	> 90%	> 85%	> 80%	80% or less
Others						
Normal Media Exchange Requests - average response time in month (working days)	< 1/2	< 1	< 2	< 3	< 5	5 or more
New User Registration Time (working days)	< 1/2	< 1	< 2	< 3	< 4	otherwise
Management Report Delivery Times (working days)	< 1	< 5	< 10	< 12	< 15	otherwise
System Maintenance - no. of scheduled sessions taken per system in the month	0	1	2	3	4	otherwise

Table 1

Table 2 gives actual performance information for the period. Overall, the CPARS Performance Achievement was satisfactory (see Table 3), i.e. green measured against the CPARS performance targets.

CSAR Service - Service Quality Report - Actual Performance Achievement

Service Quality Measure	1998		1999						
	Nov.	Dec.	Jan	Feb	March	April	May	June	July
HPC Services Availability									
Availability in Core Time (% of time)	99.99%	97.20%	99.70%	100%	100%	97.10%	98.50%	99.70%	
Availability out of Core Time (% of time)	98.53%	98.41%	100%	99.40%	98.51%	98.10%	99.71%	99.40%	
Number of Failures in month	2	5	1	3	1	1	3	2	
Mean Time between failures in 52 week rolling period (hours)	400	174.1	744	354	432	480	453	395	
Help Desk									
Non In-depth Queries - Maximum Time to resolve 50% of all queries (working days)	1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	
Non In-depth Queries - Maximum Time to resolve 95% of all queries (working days)	4	5	<1	<2	<2	<1	<3	<3	
Administrative Queries - Maximum Time to resolve 95% of all queries (working days)	2	<1	<1	<5	<2	<2	<2	<1	
Help Desk Telephone - % of calls answered within 2 minutes	100%	100%	100%	100%	100%	100%	100%	100%	
Others									
Normal Media Exchange Requests - average response time in month (working days)	0.5	0	<0.5	0	<0.5	<0.5	<0.5	<0.5	
New User Registration Time (working days)	2	0	<2	0	0	0	0	0	
Management Report Delivery Times (working days)	10	10	10	10	10	10	10	10	
System Maintenance - no. of scheduled sessions taken per system in the month	4	1	2	2	2	0	1	2	

Table 2

Notes:

1.   HPC Services Availability has been calculated using the following formulae, based on the relative NPB performance of Turing and Fermat:[Turing availability   x 122 / (122 + 3.5)] + [Fermat availability   x 3.5 / (122 + 3.5)]
2.   Mean Time Between Failures for Service Credits is formally calculated from Go-Live Date.

Table 3 gives Service Credit values for each month to date. These are accounted on a quarterly basis, formally from the Go-Live Date. The values are calculated according to agreed Service Credit Ratings and Weightings.

CSAR Service - Service Quality Report - Service Credits

| Service Quality Measure	1998		1999						
	Nov.	Dec.	Jan	Feb	March	April	May	June	July
HPC Services Availability									
Availability in Core Time (% of time)	-0.058	0.078	-0.039	-0.058	-0.058	0.078	0.039	-0.039	
Availability out of Core Time (% of time)	0.000	0.039	-0.047	0.000	0.000	0.039	-0.039	0	
Number of Failures in month	0.000	0.016	-0.008	0.000	-0.008	-0.008	0	0	
Mean Time between failures in 52 week rolling period (hours)	0.000	0.016	-0.009	0.000	0.000	0.000	0	0	
Help Desk									
Non In-depth Queries - Maximum Time to resolve 50% of all queries (working days)	0.000	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019	
Non In-depth Queries - Maximum Time to resolve 95% of all queries (working days)	0.031	0.046	-0.016	0.000	0.000	-0.016	0.016	0.016	
Administrative Queries - Maximum Time to resolve 95% of all queries (working days)	0.000	-0.016	-0.016	0.031	0.000	0.000	0	-0.016	
Help Desk Telephone - % of calls answered within 2 minutes	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	
Others									
Normal Media Exchange Requests - average response time in month (working days)	-0.002	0.000	-0.002	0.000	-0.002	-0.002	-0.002	-0.002	
New User Registration Time (working days)	0.000	0.000	0.000	0.000	0.000	0.000	0	0	
Management Report Delivery Times (working days)	0.000	0.000	0.000	0.000	0.000	0.000	0	0	
System Maintenance - no. of scheduled sessions taken per system in the month	0.006	-0.003	0.000	0.000	0.000	-0.004	-0.003	0	
Monthly Total & overall Service Quality Rating for each period:	-0.01	0.08	-0.08	-0.02	-0.05	0.03	-0.01	-0.03	0.00
Quarterly Service Credits:						-0.15		-0.03	

Table 3

The Quarterly Service Credit for the second quarter is -0.03%, i.e. the total accrued service credits for the three months in the period.
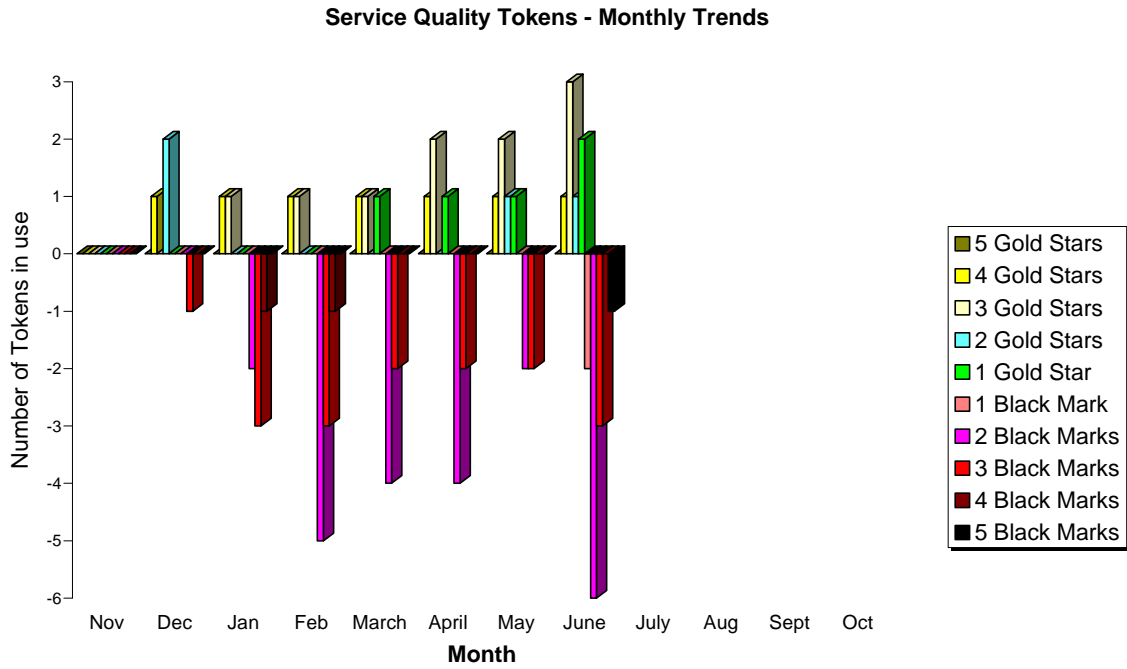
1.2   Service Quality Tokens

The current position at the end of the quarter is that 19 of the 319 registered users of the CSAR Service had used Service Quality Tokens. See below:
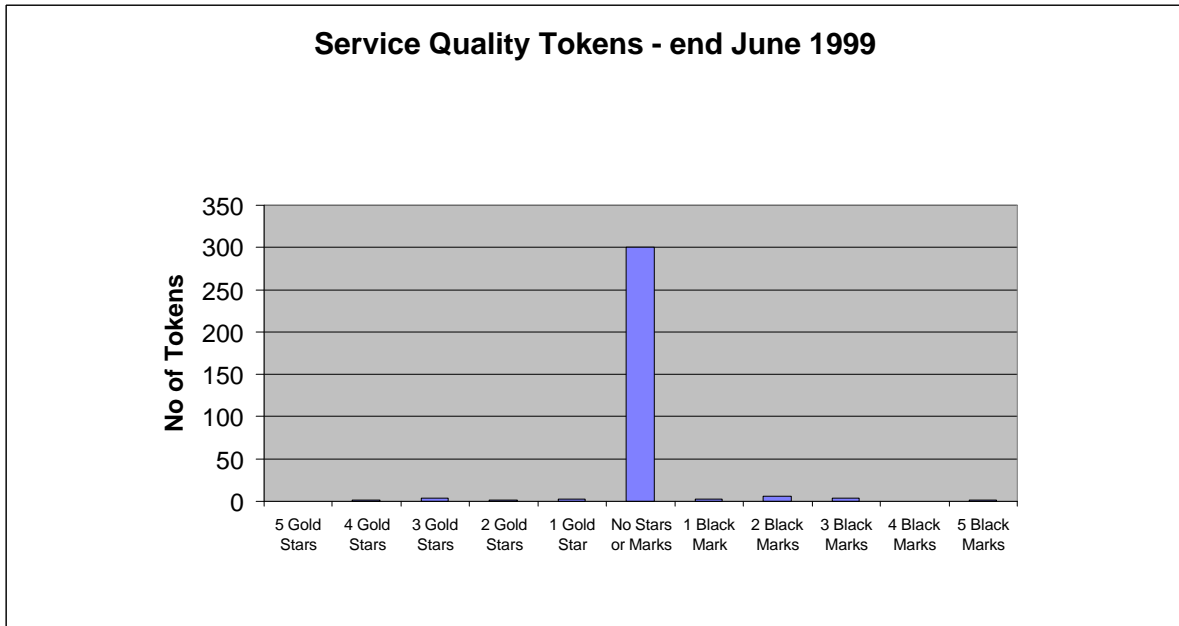
Service Quality Tokens

	Position as at end of each month											
	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct
5 Gold Stars	0	0	0	0	0	0	0	0				
4 Gold Stars	0	1	1	1	1	1	1	1				
3 Gold Stars	0	0	1	1	1	2	2	3				
2 Gold Stars	0	2	0	0	0	0	1	1				
1 Gold Star	0	0	0	0	1	1	1	2				
No Stars or Marks	0	140	177	201	233	258	275	300				
1 Black Mark	0	0	0	0	0	0	0	2				
2 Black Marks	0	0	2	5	4	4	2	6				
3 Black Marks	0	1	3	3	2	2	2	3				
4 Black Marks	0	0	1	1	0	0	0	0				
5 Black Marks	0	0	0	0	0	0	0	1				
	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct
Total No. of Users	40	144	185	212	242	268	284	319				
No Stars or Marks	0	140	177	201	233	258	275	300				

Total number of Users Registered

.
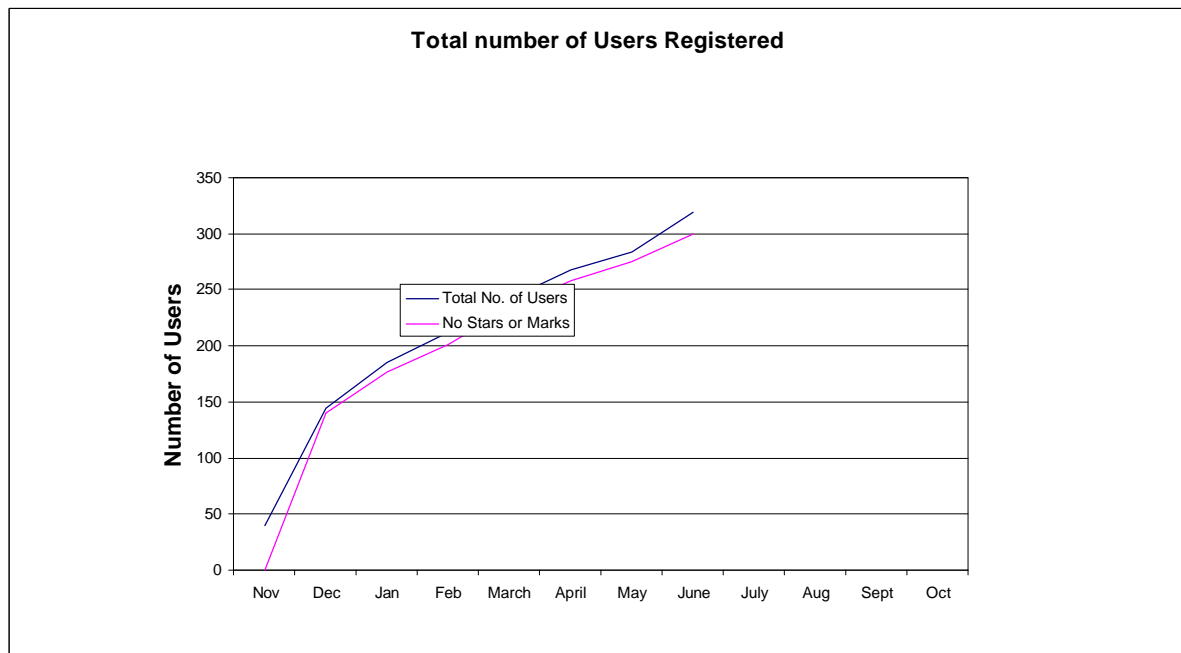
The area graph below illustrates the monthly usage trend of Service Quality Tokens:

Service Quality Tokens - Monthly Trends

In the form of a bar chart, the current statistics are:

Over the course of the quarter the position is that as a management tool the Service Quality Tokens have enabled the user to provide qualitative feedback about all aspects of the service. This feedback is used as a mechanism to initiate change in the service where appropriate.

The table below shows the outstanding marks and stars as at the end of June, with a brief description of the reason for the allocation.

SUMMARY OF SERVICE QUALITY TOKEN USAGE

No of Stars or Marks	Consortia	Date Allocated	Reason Given
5 Black Marks	CSN001	24/06/99	Archive problems
3 Black Marks	HPCI Daresbury	07/05/99	Complaints re:priority of batch work over interactive.
3 Black Marks	CSN003	02/06/99	Fuji overloaded.
2 Black Marks	HPCI Daresbury	21/06/99	Interactive access speed and network problems.
2 Black Marks	HPCI Daresbury	03/06/99	Network problems.
2 Black Marks	CSN003	30/06/99	Lack of space on the Fuji system.
2 Black Marks	CSN003	03/06/99	Network problems though support is good.
1 Black Mark	CSN003	03/06/99	Fuji overloaded.
1 Black Mark	CSN003	17/06/99	Fuji overloaded.
1 Gold Star	CSN003	11/06/99	Good support (though machine poor).
2 Gold Stars	CSE002	07/06/99	Problems now resolved.
3 Gold Stars	CSN007	07/05/99	Continued satisfaction.
3 Gold Stars	CSN003	23/06/99	Good support.

2.   HPC Services Usage

Usage information is given in tabular form, in Appendices, and in graphical format. The system usage information for the period is provided by Project/User Group, totalled by Research Council and overall. This covers:

- CPU usage
- User Disk allocation
- HSM/tape usage

In addition, the following graphs are provided to illustrate usage per month, historically:

a)   MPP (T3E) Usage by month, showing usage each month of CPU (T3E PE Elapsed Hours), split by Research Council and giving the equivalent GFLOP-Years as per NPB. The Baseline Capacity (103 GFLOP-Years) is shown by an overlaid horizontal line.

b)   SMP (Origin) Usage by month, showing usage each month in CPU Hours, split by Research Council and giving the equivalent GFLOP-Years as per NPB. The Baseline Capacity (3.5 GFLOP-Years) is shown by an overlaid horizontal line.

c)   High Performance Disk (T3E) allocated for User Data by month, showing the allocated space each month in GBytes, split by Research Council. The Baseline Capacity (1 Terabyte) is shown by an overlaid horizontal line.

d)   Medium Performance Disk (Origin) allocated for User Data by month, showing the allocated space each month in GBytes, split by Research Council. The Baseline Capacity (1.5 Terabytes) is shown by an overlaid horizontal line.

e)   HSM/Tape Usage (T3E) by month, showing the volumes held each in GBytes, split by Research Council. The Baseline Capacity (16 Terabytes) available will be shown by an overlaid horizontal line.

2.1   Disk/HSM Usage Charts

The graphs below show current monthly disk and HSM allocations and usage.

Turing - High Performance Disk allocation and usage by Research Council for June (Class 1 Users)
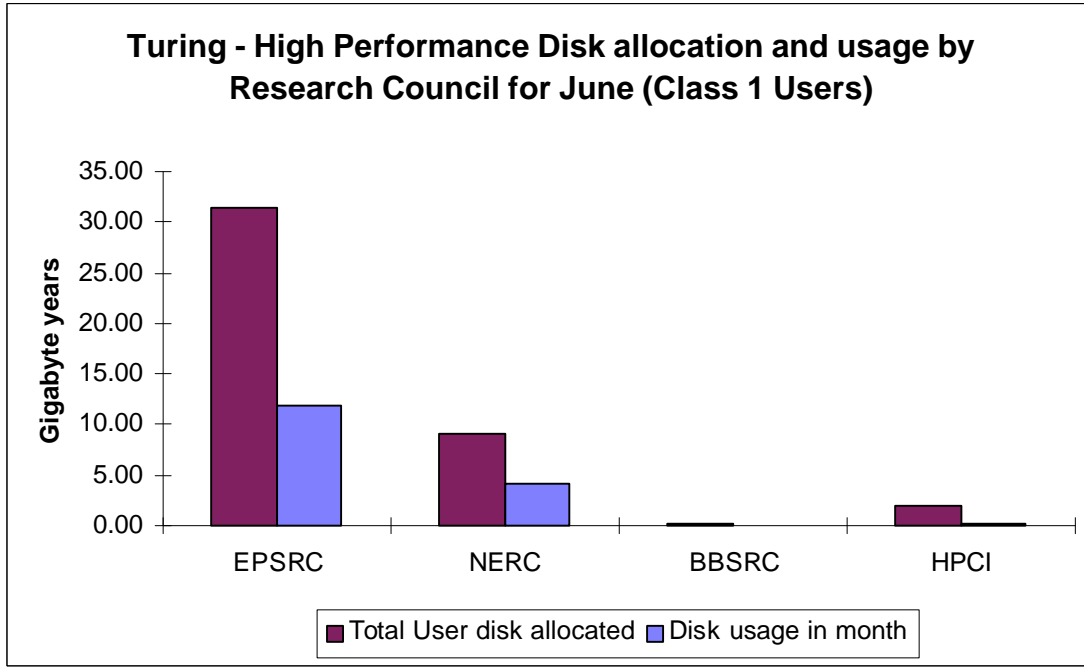
The preceding graph shows actual usage in June against the current allocation of disk on the Turing system.

Fermat - Medium Performance Disk allocation and usage by Research Council for June (Class 1 Users)
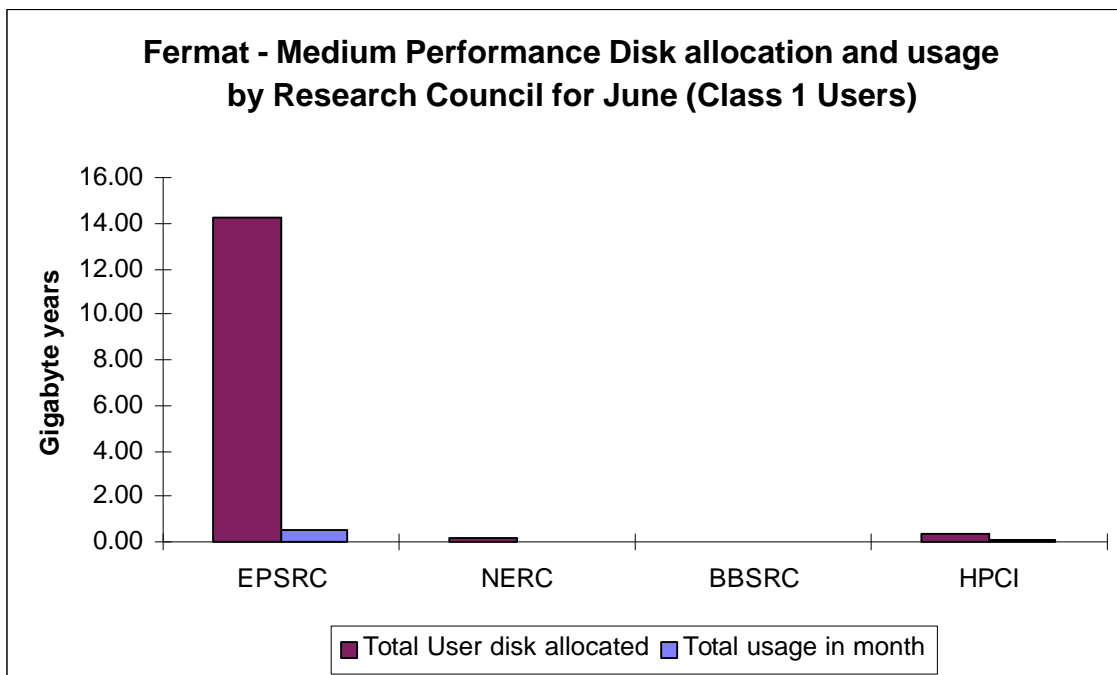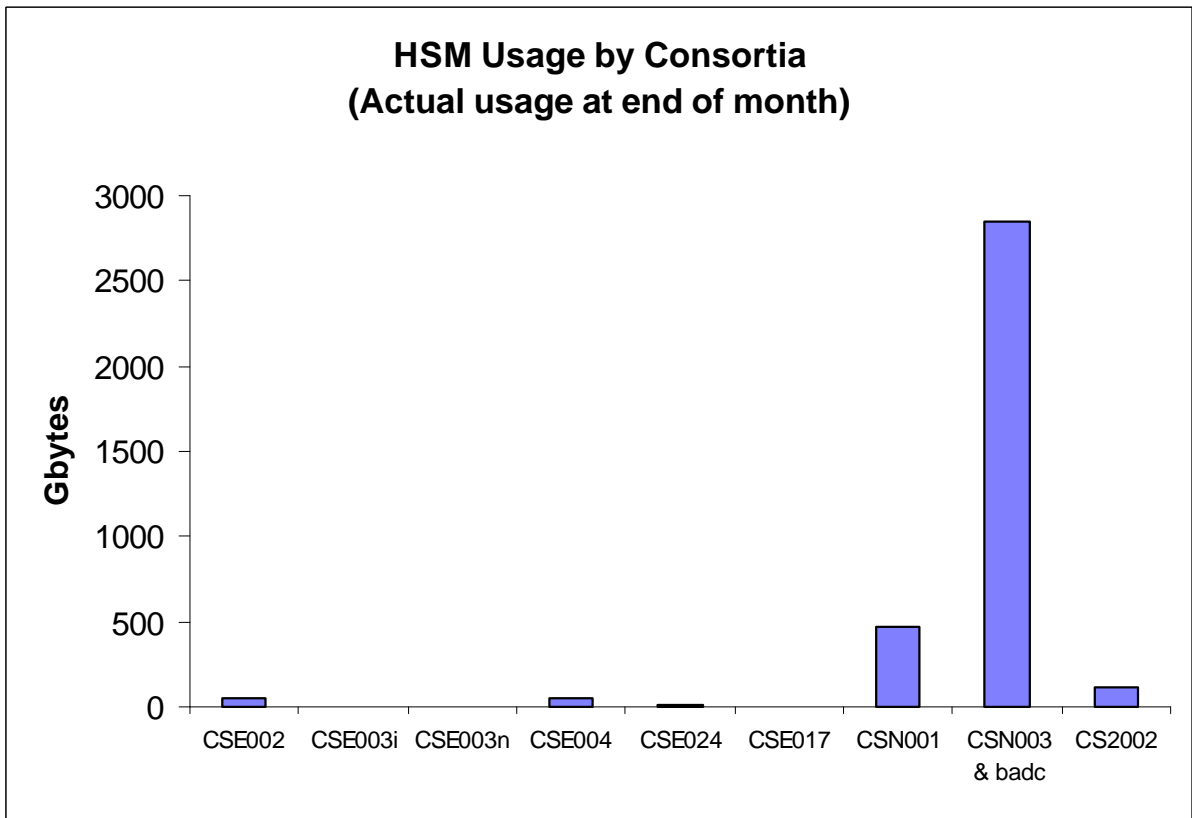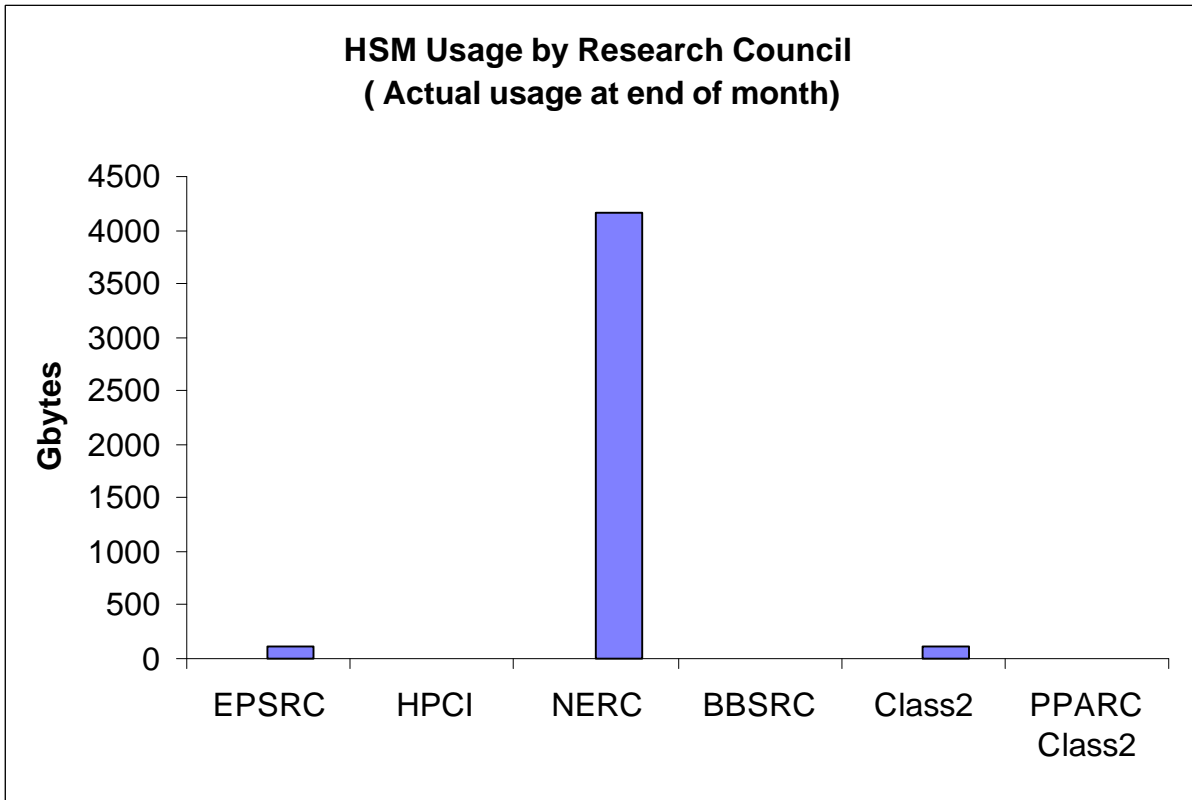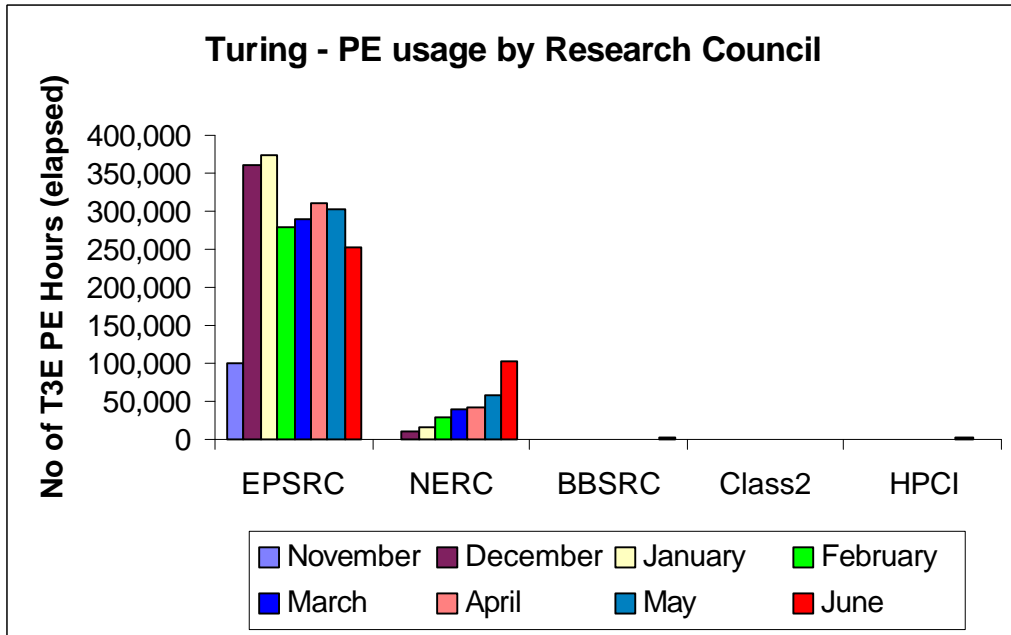
The above graph shows the disk allocations against usage of the disk on Fermat during June.

HSM Usage by Research Council for June

Gigabyte years
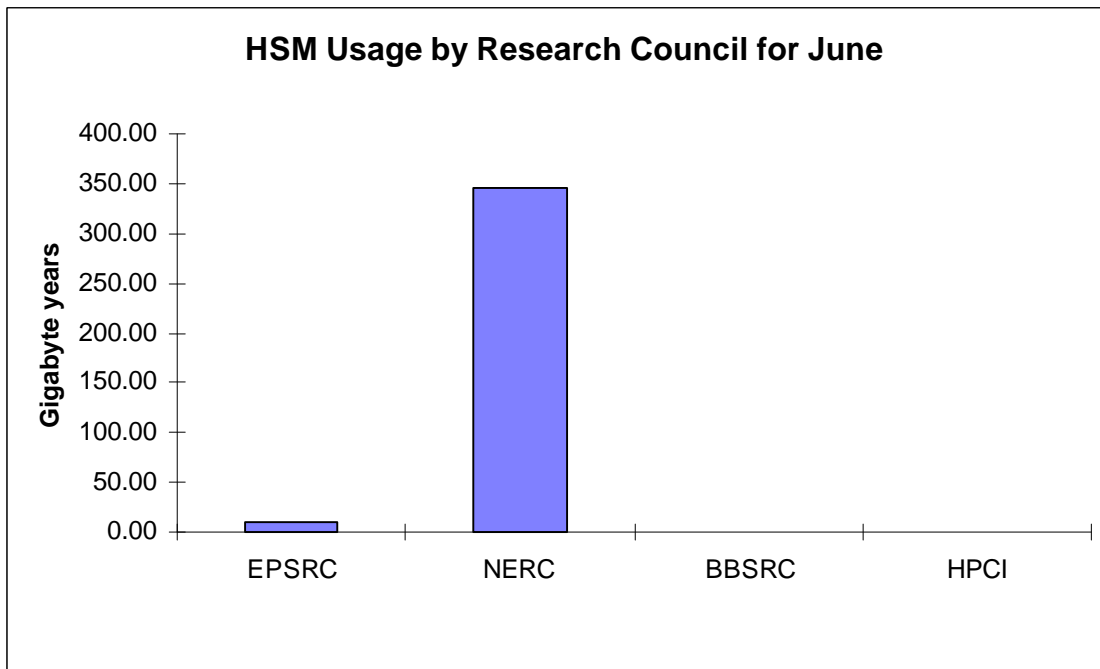
The above graph shows the total usage of the HSM facility by Research Council during June.

The next two graphs give actual usage of HSM by Research Council and by Consortium as at end June.

HSM Usage by Research Council
(Actual usage at end of month)

HSM Usage by Consortia
(Actual usage at end of month)

Turing - PE usage by Research Council
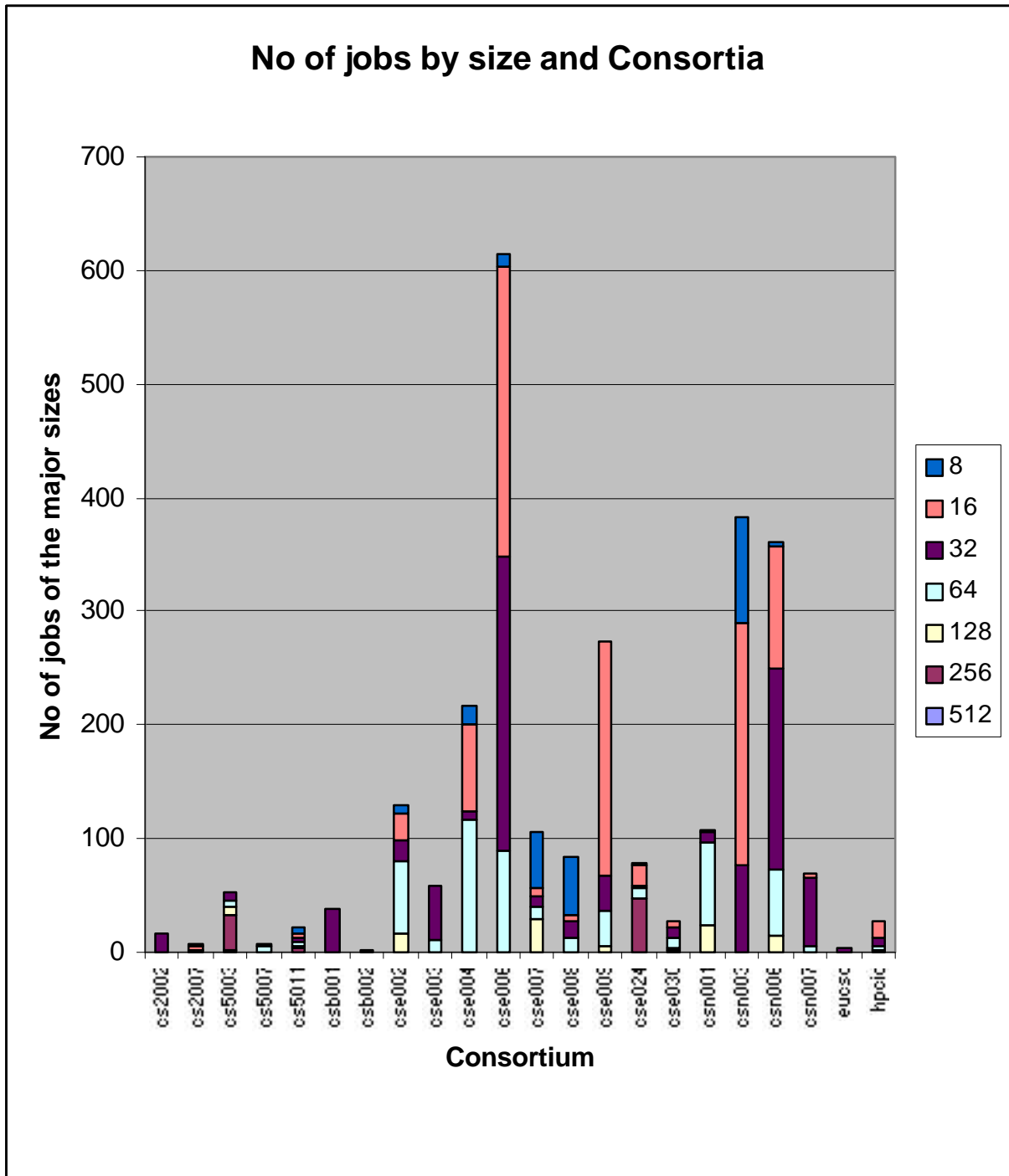
Turing PE usage is shown by Research Council during the months of service to date in the above chart.

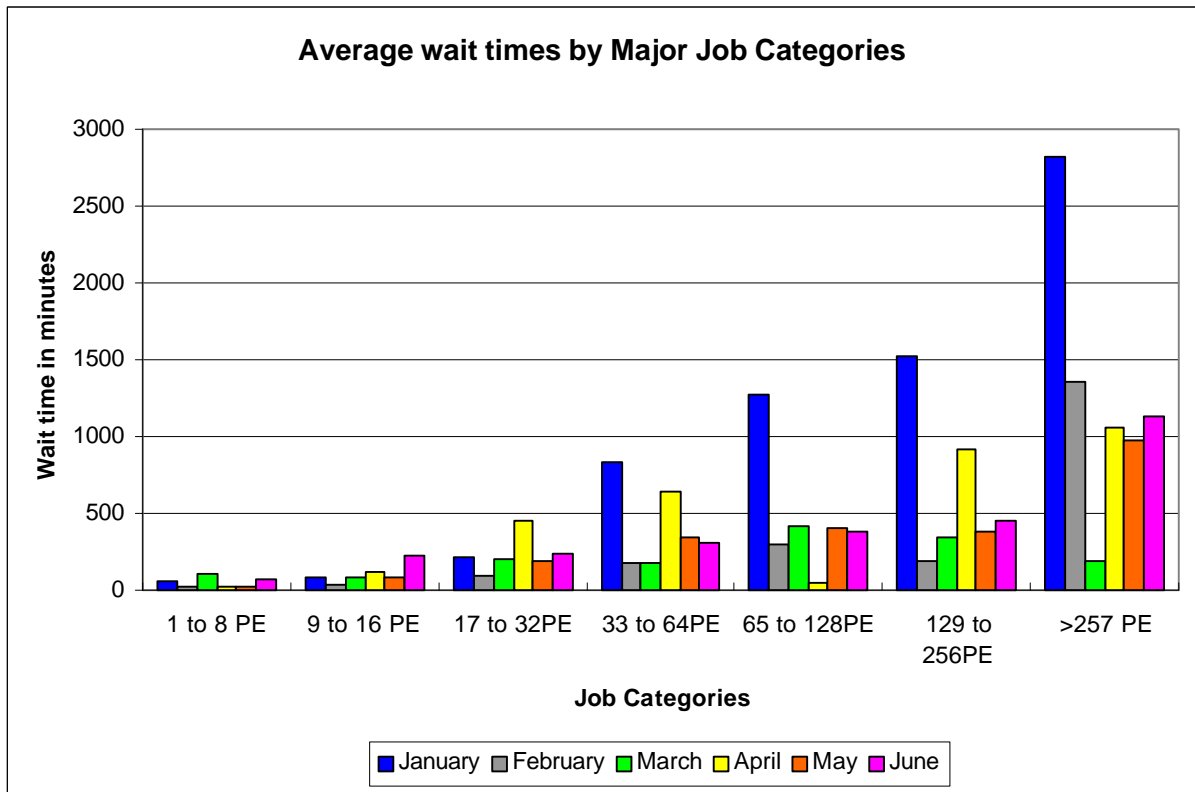**Fermat - CPU usage by Research Council**
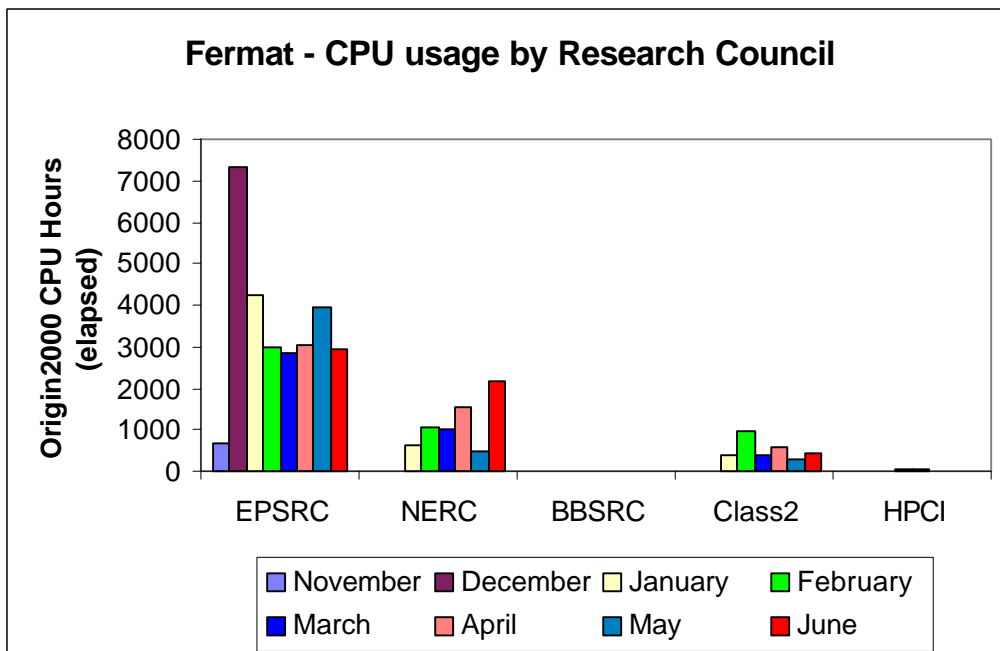
Origin2000 CPU usage is shown by Research Council during the months of service to date in the above chart.

Job statistics for Turing:

The above graph shows the number of jobs of the major sizes run in the period 1st to 30th June 1999.

The next graph shows the wait times in minutes for the major categories of jobs.

The above chart shows the average wait time trend over the months from January to date.
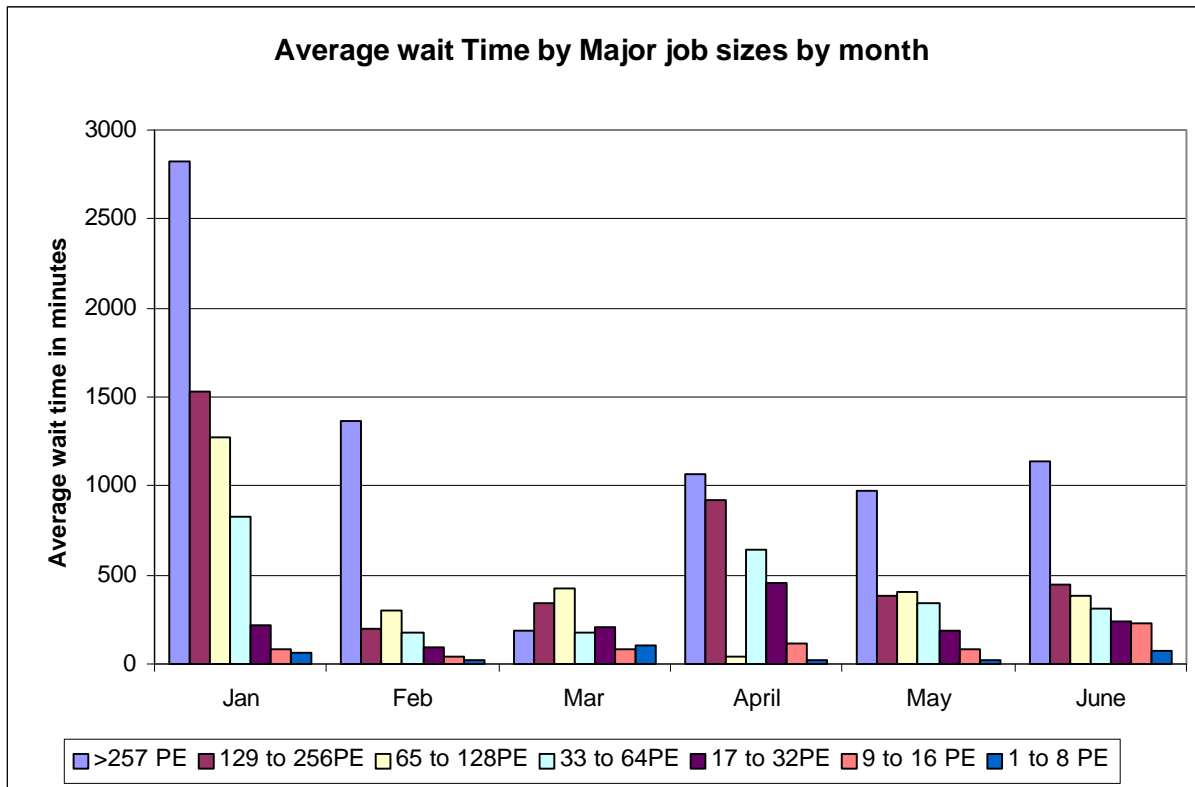
It can be seen from the above graph that enhancements to the scheduling on Turing have reduced the average wait times however attention must be paid to ensure sufficient head room exists in the system to prevent wait times from rising

2.2   Historic Usage Charts

2.2.1Class 2 & 3 Usage Charts

The next series of charts show the usage of the system by the class 2 & class 3 users. The usage is shown by project and identifies the Research Council of the individual projects.
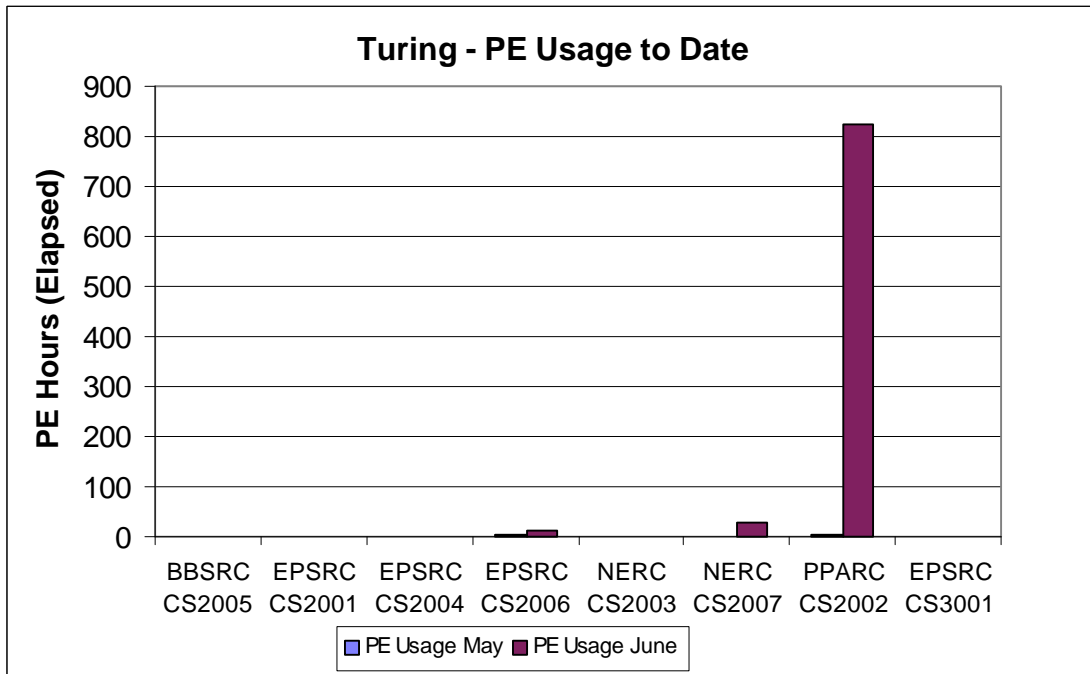
The above chart shows the PE usage of the Turing system.
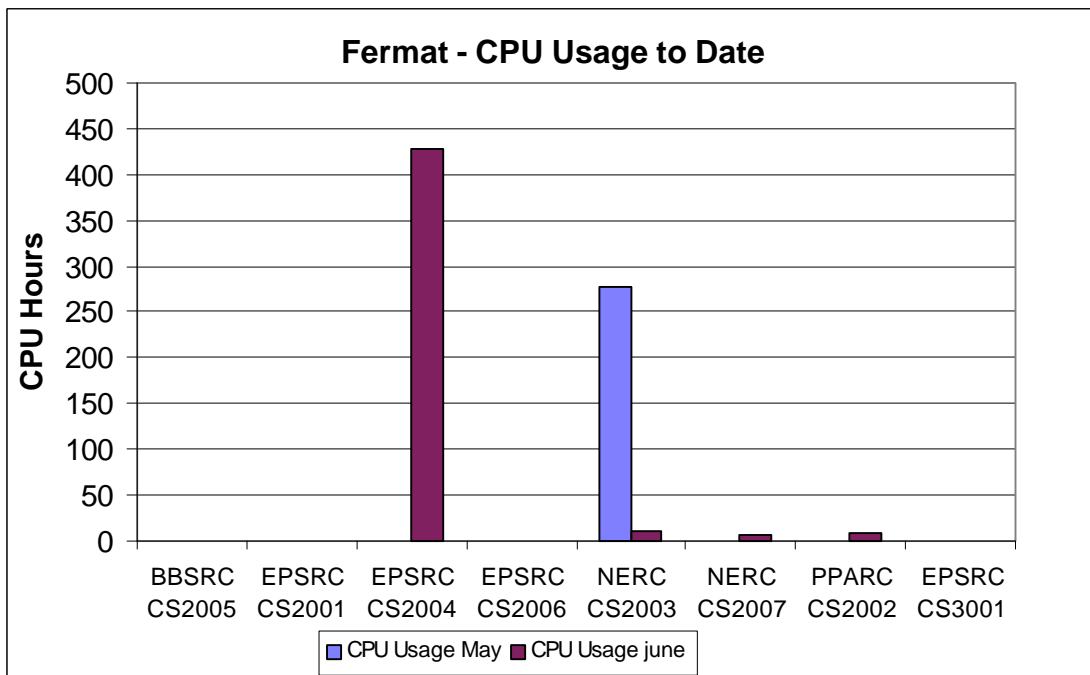
The above chart shows the CPU usage of the Fermat system.

Turing - HP Disk Allocation & Usage to Date
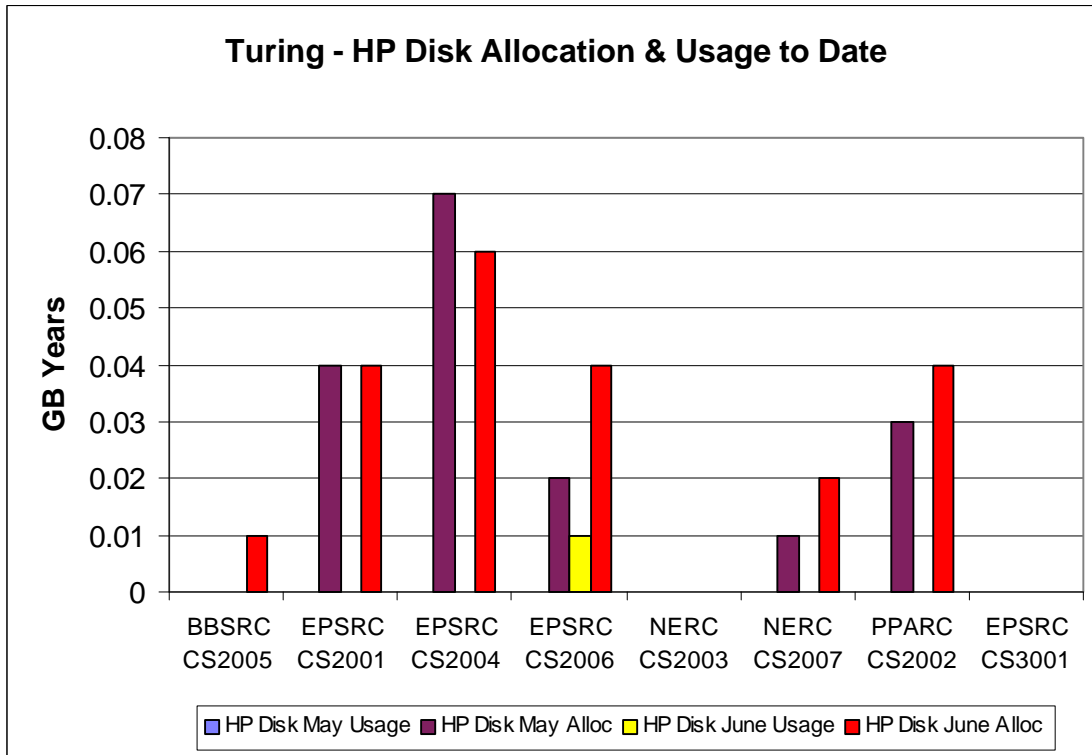
The above chart shows the disk allocations on the Turing system.

Fermat - MP Disk Allocation & Usage to Date
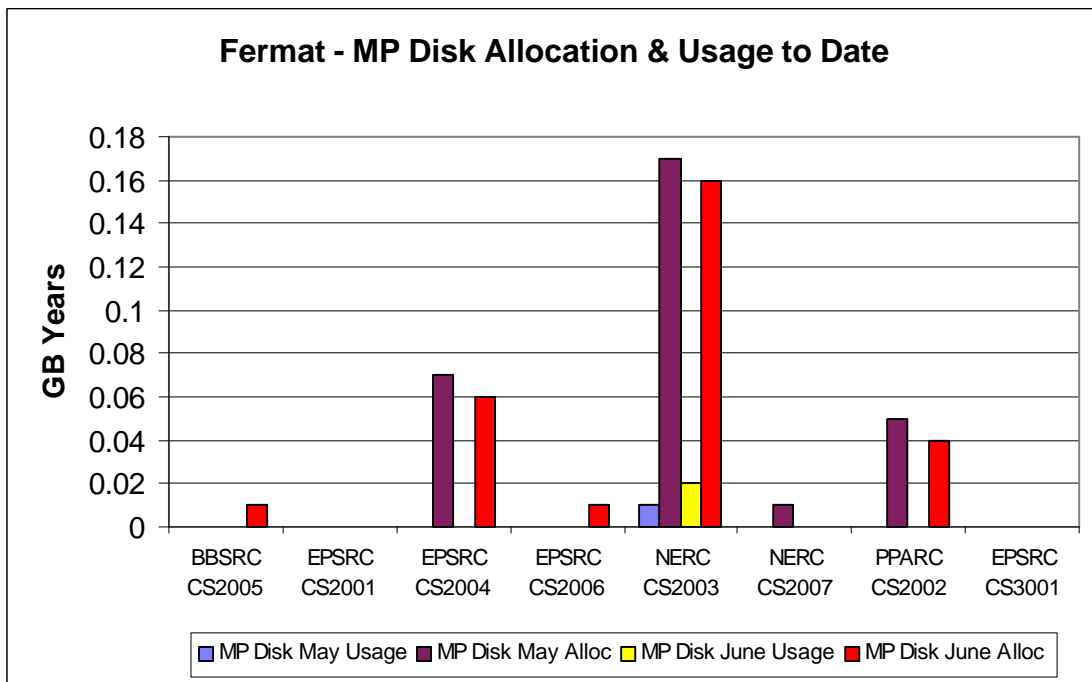
The above chart shows the disk allocations on the Fermat system.

HSM Usage for Class 2 & 3 Users to Date
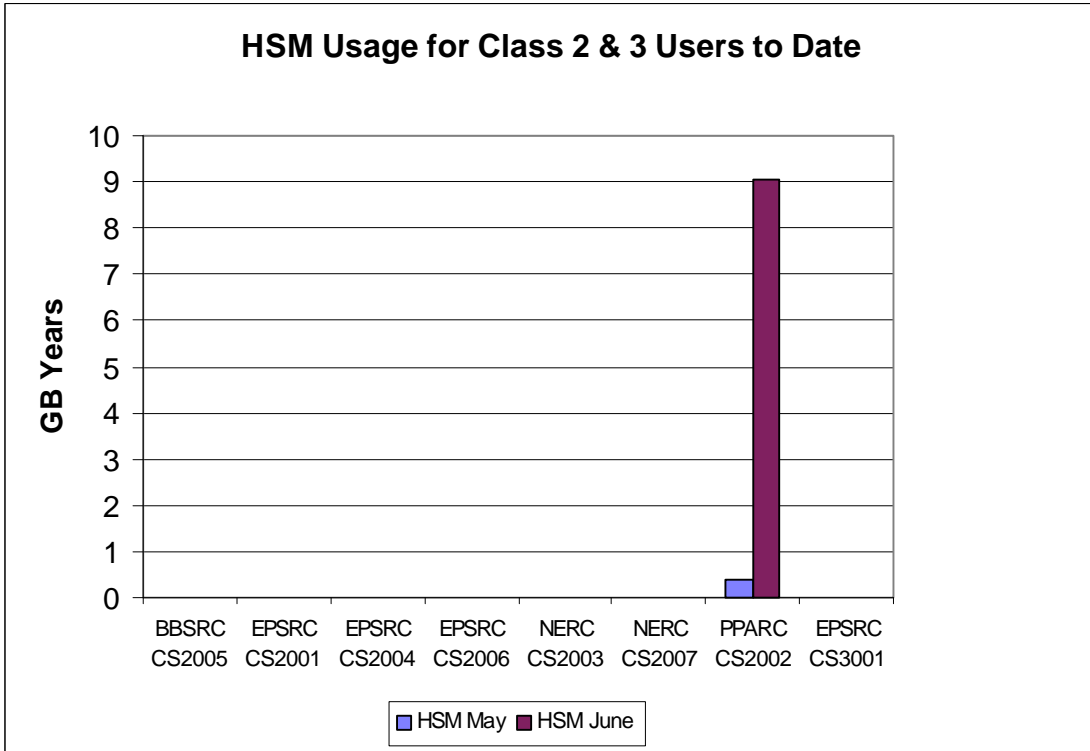
The above chart shows the HSM usage.

2.2.2   Baseline System Usage Graphs

In all the Usage Charts, the baseline varies dependant on the number of days in each month, within a 365-day year. The reduced Baseline in November 1998 represents half a month.

The graph below shows the PE hour's utilisation on Turing by Research Council from November 1998.
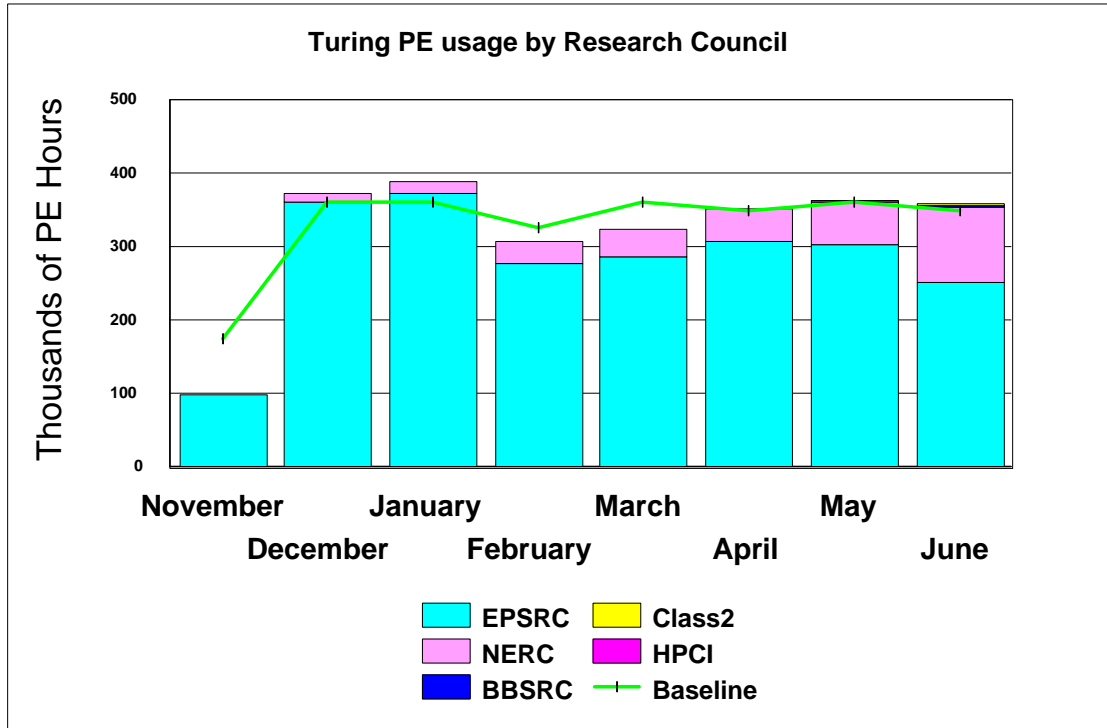
The graph below shows the historic CPU usage on Fermat by Research Council from November.
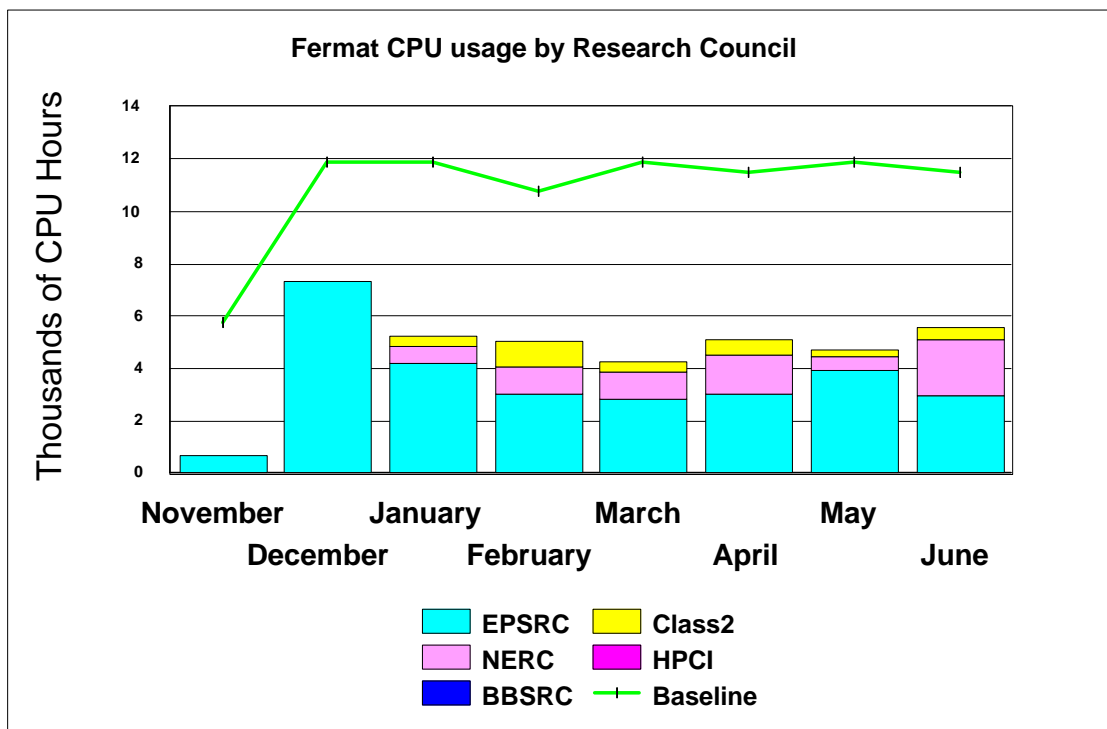
The next series of graphs illustrates the usage of the disk and HSM resources of the system.

HP Disk allocation by Research Council
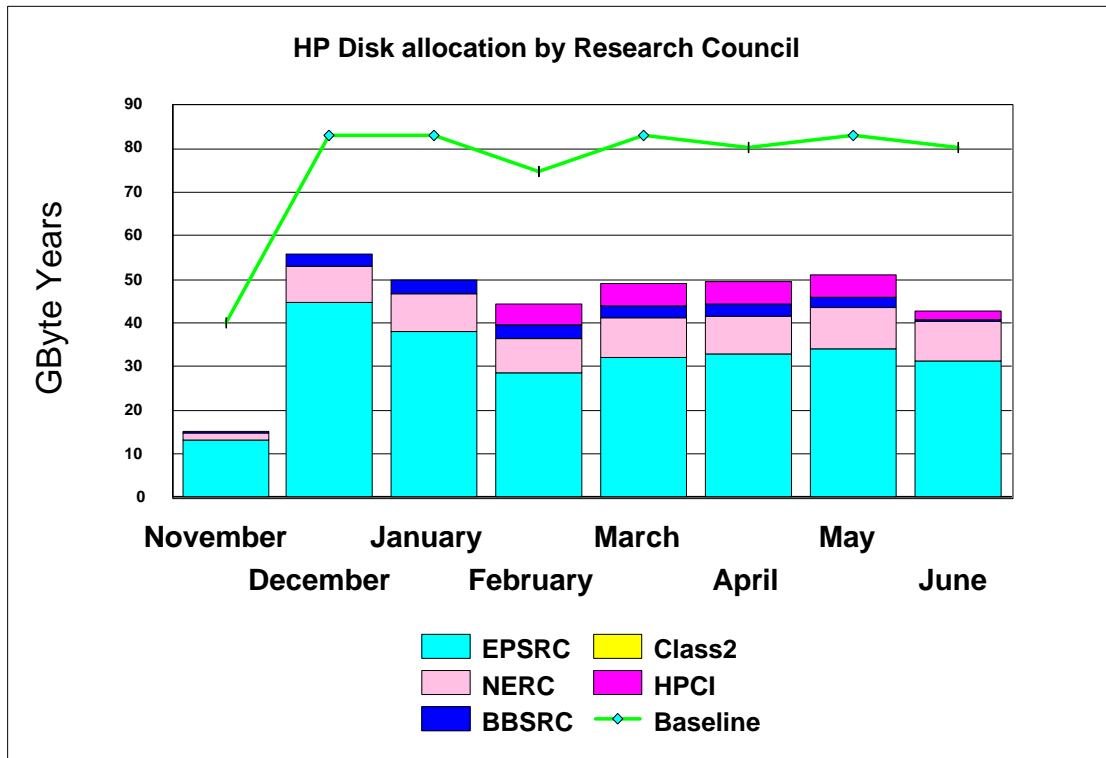
The preceding graph illustrates the historic allocation of the High Performance Disk on Turing.

MP Disk allocation by Research Council
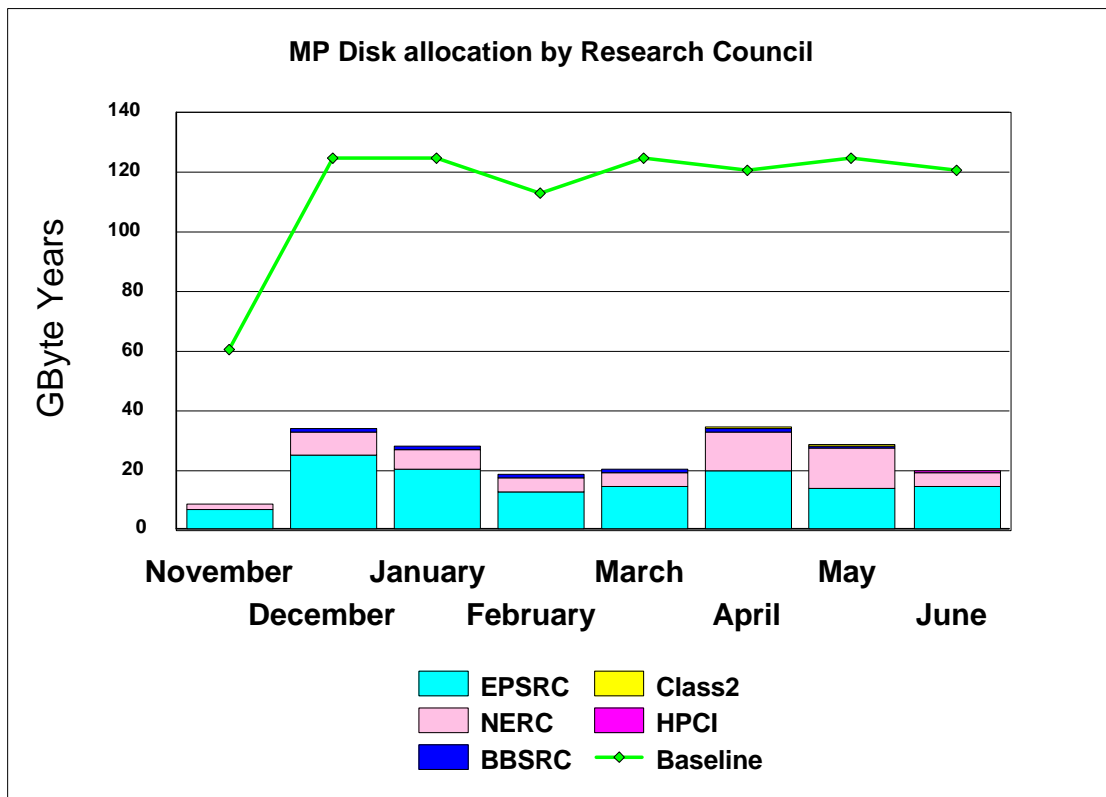
The graph above illustrates the historic allocation of the Medium Performance Disk on Fermat.

The graph below shows the historic HSM usage by Research Council funded projects. The primary usage is for NERC.

HSM usage by Research Council
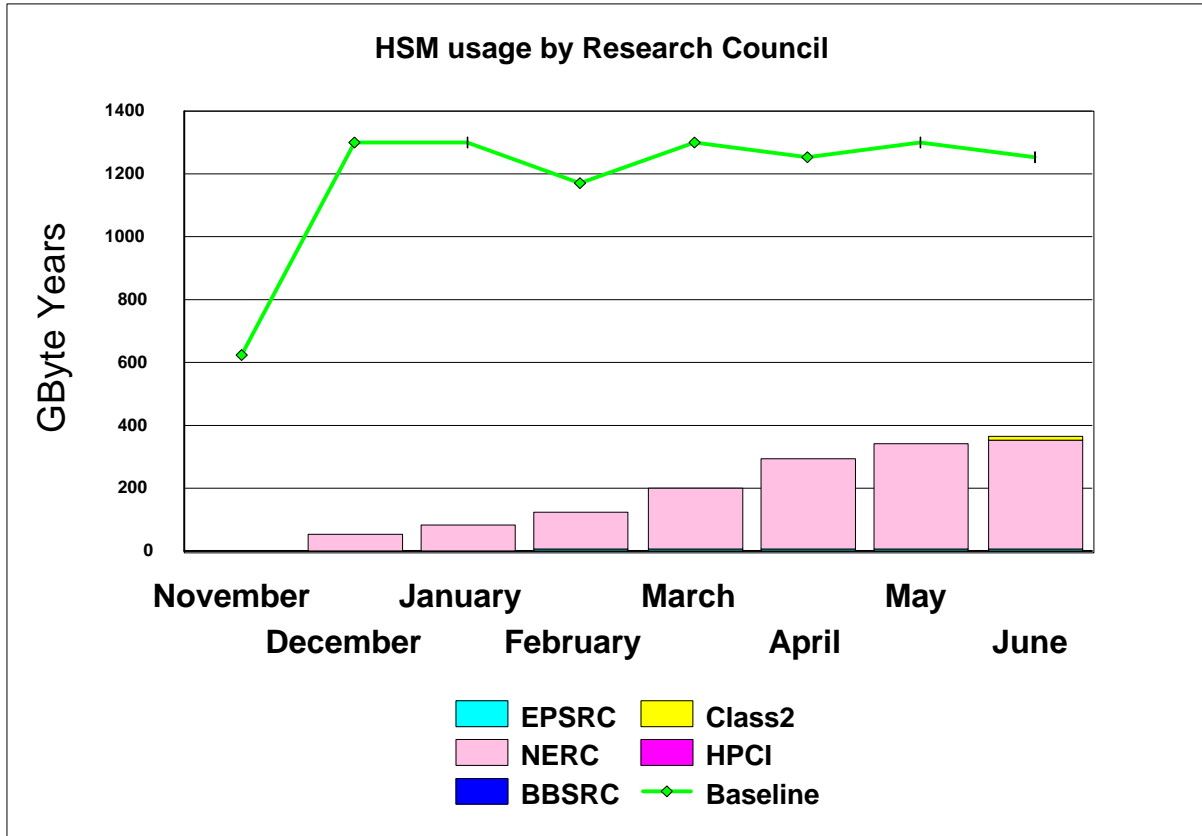
2.2.2   Guest System Usage Graphs

Fuji Usage by Research Council

CPU Hours

| | 1200 | 1000 | 800 | 600 | 400 | 200 | 0 |

March   April   May   June

EPSRC   BBSRC   HPCI
NERC   Class2
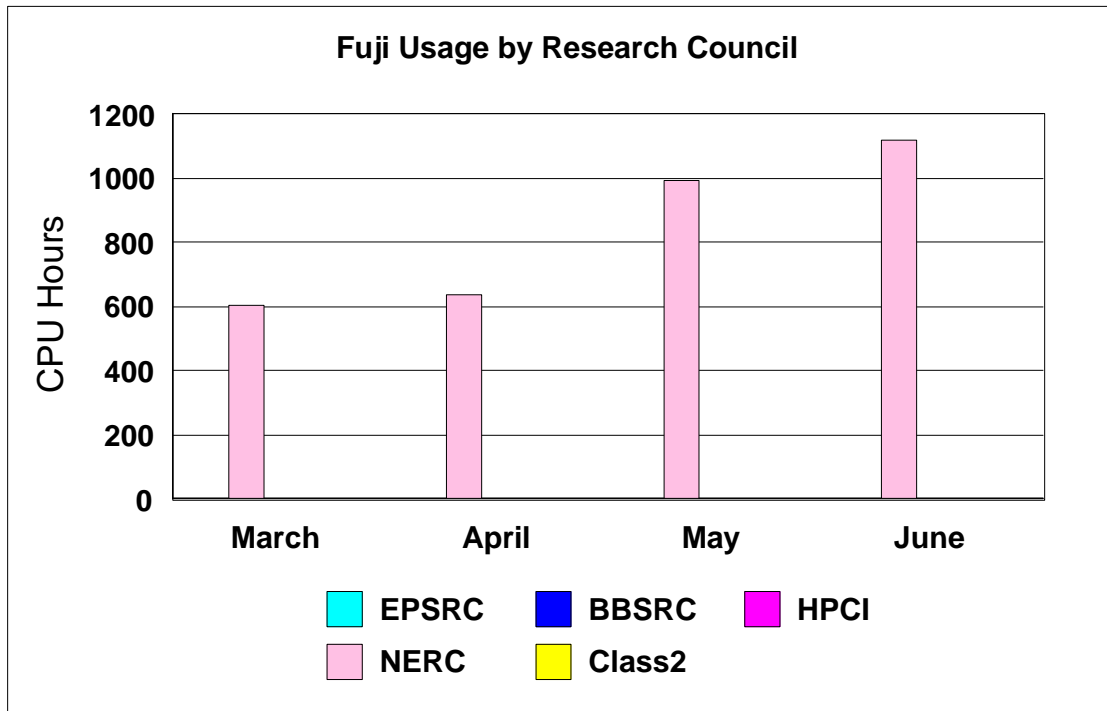
The above graph shows the current CPU usage on the Fujitsu VPP 300 NERC system based at the University of Manchester.

CSC J90 usage

CPU Hours

900
800
700
600
500
400
300
200
100
0

March   April   May   June

EPSRC   BBSRC   HPCI
NERC   Class2
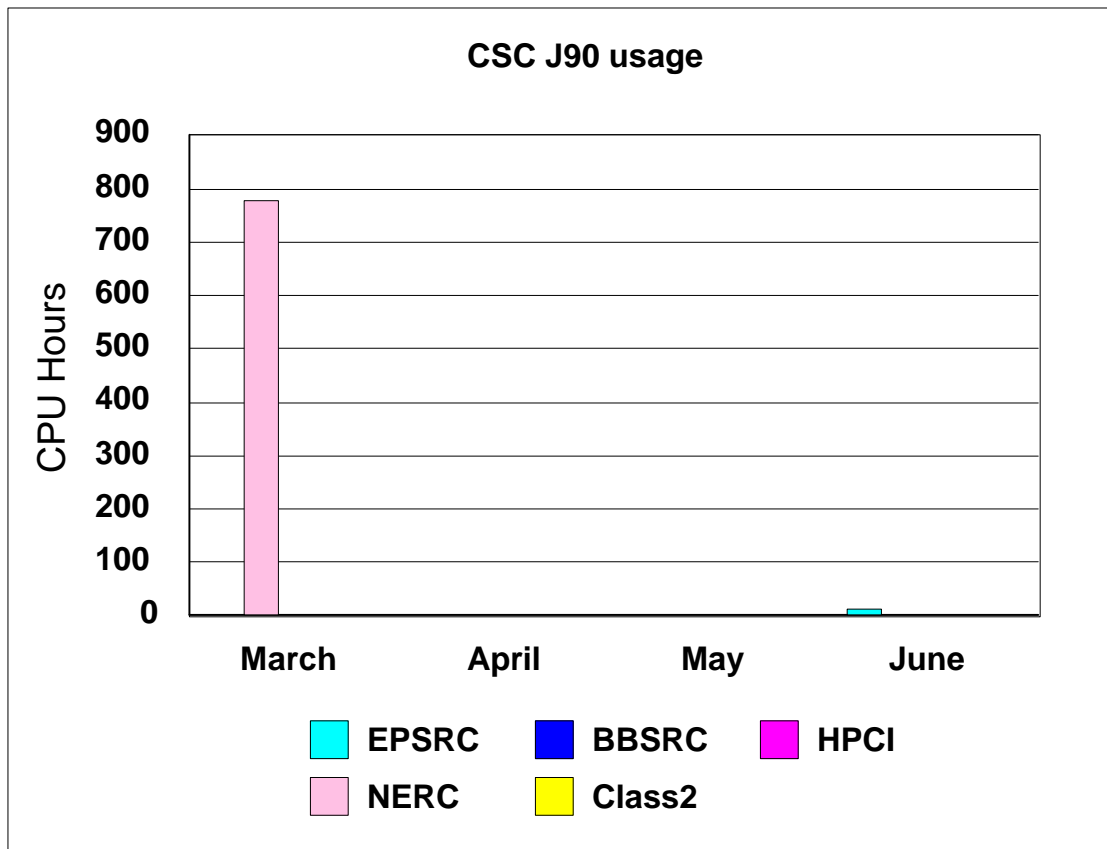
The above graph shows the current usage on the CSC Cray J90 based at the CSC, in Farnborough.

2.3   Service Status, Issues and Plans

Status

The current status is that Fermat is now running IRIX 6.5.4. This provided fixes for the miser utility which, subsequent to discussion at the user forum, is to be introduced shortly. This will provide an improved scheduling environment on Fermat.

Turing is now running UNICOS 2.0.4.60. This gives additional functionality that was again discussed at the user forum. This will provide benefits to both batch and interactive users of the CSAR service.

Issues

The Sub Consortia facility has now been introduced and despite a slow take-up is now being used by several projects.

There has been a large number of black marks allocated due to problems with the Fuji system, these comments have been noted and passed to NERC, as they are not currently within the scope of the CfS consortia.

ATM networking problems exacerbated the Fuji problems as mentioned above. These issues have now been successfully resolved.

Problems with the hold area and the data migration facility were experienced in June. This was one of the main issues raised at the user forum. The problems were due to a number of factors. There have been some unexpected tape drive problems which has been raised as an issue with the manufacturer. A small number of users have been storing large quantities of small files in hold. These small files are below the migration limits so the effect is to reduce the efficiency of DMF. It was agreed at the User Forum to re-issue the guidelines for the use of hold.

Plans

The miser utility as mentioned earlier in this document, is scheduled for introduction on Fermat.

A new psched setup is to be introduced on Turing which will benefit both interactive and batch users.

TMF is still under test as several problems have been identified and are being worked on.

The latest available capacity plan and supporting documentation are attached to this report for additional information as **Appendix 2.** The plans indicate that an upgrade to Turing is required the exact detail of which will be published after the next quarterly CfS Management Board meeting.

3   Science Application Support Services

In this section we review the activities of the applications and optimisation staff, including the provision of applications/optimisation support to projects, the development and delivery of training courses, applications software installation, collaboration with HPCi Centres, and other outreach and development activities.

3.1   Applications/Optimisation Support

The liaison programme announced in the last quarterly report is proving to be a valuable link between the CSAR projects and the applications/optimisation staff. We have identified a method of working, which involves offering support to projects with support tokens and enables the project to see how their tokens are being used. The CSAR staff make an initial estimate of the possibilities of improving the code. This may involve a site visit, or it may involve members of the project visiting CSAR. At the end of this initial assessment, the aim is to have an agreed plan of work. This involves the PI in committing a number of days of effort via support tokens with with review marker dates at which CSAR staff present a report of progress and agreement on further commitment of tokens is reached with the PI.

This system is new for both CSAR staff and users. It resembles consultancy work and experience from joint projects with local engineering consultancy companies has proved useful in establishing a method of working. The process has started with several projects involving groups such as UKCP, OCCAM, UK Turbulence Consortium, Terra and Colloid Hydrodynamics E7.

3.2   Installation of applications (and other) software

The Harwell Subroutine Library was requested by two consortia. This is a general purpose mathematical library, similar to the Nag Library but it contains routines specifically for solving problems which involve sparse matrices, that are not available elsewhere. This Library has now been installed on turing.

In a recent application there has been a short-term request for HPF (High Performance Fortran), which is not currently available on the CSAR service. This has been pursued both with the applicant and with the vendor (Portland Group). It is likely that the consortium will extend their existing licence purely for their own use on turing.

3.3   Collaboration with HPCi Centres

The workshop on Computational Chemistry planned for the end of September is being rescheduled. The intention is to arrange and announce such a workshop and we will publicise this when ready. Our Chemistry support staff have worked closely with Daresbury HPCi, especially over providing training and support for DL-POLY, which is proving to be of interest to several CSAR projects. We are also involved in joint work to optimise the newly released CASTEP code. An HPCi workshop on FFTs was held in May at CSAR.

We are continuing to actively develop support for OpenMP and CSAR staff participated in the workshop recently organised at EPCC. We have also continued our liaison with Southampton HPCi in support of the OCCAM and UGAMP consortia.

3.4   Visits to consortia and other potential users

UK Turbulence consortium was visited in July.

Visits and contacts have continued to be exchanged with UKCP. This has expanded into a second project.

One group from the HPC for Complex Fluids consortium has visited Manchester Computing for detailed optimisation and parallelisation support.

3.5   Novel techniques/applications development

We have continued our contacts with the Tera project and have been investigating novel methods of visualising their data. This may be of potential benefit to other projects that work in spherical geometry.

We are currently investigating the possibility of running coupled models on both Turing and Fermat by using PVM. A preliminary application has been run and a technical report on this experiment is being produced. We would like to extend these experiments to models linked via MPI. This requires extensions to the MPI libraries to use Turing and Fermat as a metacomputing network. We are actively investigating this possibility with major European metacomputing projects (e.g. METHODIS) that have developed such libraries.

4   Training & Education Services

During April and May the following one day (unless otherwise stated) courses were put on at Manchester by the CSAR staff

Shared Memory Parallelisation with Open/MP
Introduction to High Performance Computing
Introduction to Programming with MPI
Advanced MPI
Introduction to CSAR Service
Porting Optimising for the Cray T3E-1200E
SGI Origin2000 Optimisation and Parallelisation - 3 days
Advanced JAVA
Using the CSAR Service, twice
Parallel Vector Processing on the Fujitsu VPP 300 - 2 days

The following one day courses, run in April and May by MVC staff, also form
part of the CSAR course portfolio
Introduction to JAVA
Advanced JAVA
Introduction to 3D Computer Animation
Visualization for Medical Applications

The programme for the next semester (October to December) has also been established and contains a substantial number of courses under the CSAR portfolio. They course topics is similar to that above.

It is clear the take up on these courses from CSAR users is disappointing and we are, as previously reported, trying to establish the exact requirements of CSAR users. To that end we are planning a number of more focussed activities, such as the Unified Model and computational chemistry courses/seminars mentioned in other parts of this report.
Three new courses are under development: "Computer Architecture for Science & Engineering", "An Introduction to the SGI Origin2000" and "JAVA for HPC".

We gave some assistance to the CCP5 Summer School on Methods in Molecular Simulation.

The MRCCS summer school is also taking some training and education effort from the CSAR staff.

We are running a seminar programme internally at the moment which is being broadcast live over the internet. We hope to make this programme more widely available in the next semester when our experiments are finished. People will be encouraged to a) watch the broadcast live over the internet b) attend Manchester in person to hear the seminar, or c) watch an archive version of it.

We are investigating ways in which our existing course portfolio can be converted into distance learning materials to make them more widely available. We expect this evaluation study to complete towards the end of this year.

5   User Registration and Project Management Services

This section covers aspects relating to the registration of projects and users, and the management of projects and resources. It includes a summary of key developments in the CSAR Registration System, the web-based system used for both project and user registration and all project management tasks by users, PIs, and CSAR staff.

The first quarter of 1999 saw significant improvements in the performance and ease of use of the Registration System, along with developments of additional functionality. A major new release was made in early April 1999, and the main features in that release are summarised below, along with other key developments in the second quarter:

- **Sub-project facilities**

This allows projects with a natural division into sub-groups to manage their project's resources at a sub-group level and thereby exercise greater control over resource usage. This facility was made available in early April, and PIs of existing projects were invited to use it. New projects are also asked if they require this facility. For existing projects the transition to sub-projects is not trivial, but the bulk of the effort is at CSAR. To date three projects have asked for sub-projects to be implemented for their existing projects.

- **Resource usage controls**

Formal warning and stopping mechanisms are now in place for project, sub-project and user level allocations. This automates an important aspect of PI project management tasks as well as overall resource usage control by CSAR. PIs and/or users receive warning emails when their usage approaches their allocation, and if the situation is not rectified sanctions are imposed if usage subsequently exceeds the allocation. Currently the default sanction is a stop on all turing batch jobs for overuse of any resource. In some cases this will be an ineffective sanction (for users of fermat only for example) and alternative sanctions may need to be imposed in some cases. It appears that the warnings are generally effective and stops have been enforced only in cases where there are insufficient resources available to a project overall, or where individual users have consumed their allocated share.

- **Capacity Plans**

Capacity plans for individual projects were made available in early April.   These are available from projects' pages in the registration database and are closely linked with the Trading Pool.

Plans for existing projects were populated with information on proposed usage if this was available; many of the projects transferring from other services were not required to provide this information (moves from the J90/Fujitsu at RAL, and all non-EPSRC moves). PIs have been asked to regularly review their plans in the light of actual and expected usage. This information is essential if CSAR is to maintain the required capacity for all projects. Information from individual plans is extracted on a daily basis, and checks are made at intervals against actual usage. Projects at peer-review stage are given a dummy project with a capacity plan, so that this information is included in overall capacity planning for the service.

- **Web-based Usage Reports**

Web-based Usage Reports are available to all at http://www.csar.cfs.ac.uk/reports/accounts. This facility allows anyone to query resource usage at a user, project or Research Council level for chosen months, along with daily

breakdowns. This is provided as a web-based and more comprehensive alternative to the 'lac' command on turing. The lac command was initially provided as a temporary reporting mechanism, but as it is used by a number of users/PIs it will remain but is unlikely to be developed further. The primary source of information on resource usage will be the web-based usage reports, and we expect that this facility will be developed further in the coming months depending on user/PI requirements. We have had a recent request to include an option to show usage in terms of generic service tokens, and this is expected to be implemented shortly.

- **General CSAR web site improvements**

Work has been ongoing throughout the second quarter to update and enhance the CSAR web site as a whole, and a new version is planned for release at the end of July. Information is to be re-organised to separate user specific information (software, documentation, system usage information etc.) from registration, administrative and management information and facilities.   In addition there will be changes to the pages on applying for resources, self-registering, and getting started; and enhanced navigation and search tools.

6   Value-Added Services

6.1   Access to Enhanced HPC Facilities

The level of usage from external clients has not yet reached a level at which the enhancement of existing facilities can be initiated.

6.2   Industrial Liaison Programme

- **Joint Projects** – SGL and UoM have now presented the course on Unified Model twice to the Met. Office twice and plans are in place for further presentations of the course. We are discussing how to best present this course to UGAMP users of the CSAR Service.

- **Databases** – Databases are covered below. SGI and CSC will publish these databases using their marketing infrastructure in the fullness of time.

- **Visiting Scientist Programme** – SGL sponsored a major meeting on Scientific Computing on the occasion of the Royal Institution Bicentennial in early May. More than 250 UK scientists attended the first day and were able to interact with invited speakers from a wide range of disciplines. The keynote address was given by Dr Frederick Hausheer, the Chief Executive Officer of Bionumerik Pharmaceutical. On the second day, six parallel discussion groups refined and developed dialogue on key scientific areas**.**

6.3   Research Liaison Programme

We have hosted a further visitor from the Japan Atomic Energy Research Institute. We are investigating the possibilities of using their software for further meta-computing experiments, and we expect to be able to integrate this with our meta-computing work with HLRS and local experiments on distributed computing.

Dr J Brooke has been award a Royal Society Study Grant to work with the Department of Astronomy and Geosciences at the University of Olu, Finland to work on the analysis of historical sunspot data records.

Relations with the High Performance Computing Centre (HLRS) at the University of Stuttgart continue to develop. We are working closely with them and their EU project partners to contribute and man a stand at Supercomputing 99.

We had a meeting, during the Cray User Group Meeting in May in Minneapolis, with San Diego Supercomputer Centre and the Arctic Region Supercomputer centre to discuss further ways of collaboration through exchange of staff and training materials.

6.4   New Applications Initiative

A number of CfS meetings have been held concerning OpenGL Volumizer, a new API for volumetric visualization targeted at very large 3D or 4D data sets. The project to develop modules for AVS/Express, which are multi-pipe capable, has now completed a working prototype and we are discussing with CfS and AVS Inc how to best resource the completion of a production version of this powerful module. We expect to be able to make this available to CSAR users, in some form, in the early part of 2000.

6.5   Auxiliary Equipment

A web page has been published describing this scheme to allow researchers to use graphics workstation products on a loaner basis. Both Unix based and NT based systems are available from the loaner pool. The first system requested, an Octane Workstation, has been installed with a service user.

6.6   Technology Access

We continue to explore opportunities for access to additional technology.

6.7   Databases

We are currently working on the infrastructure requirements for the scientific abstracts and results databases, with the intention to have this facility in place by September 1999.

Once in place, we will work with the Research Councils to devise strategies for providing appropriate encouragement for participation by scientists. The annual user survey will provide an opportunity to gather views and determine levels of interest in the database facilities.

6.8   Adding value to other major research facilities

We have reviewed a number of potential situations within the range of major UK research facilities in which possibilities exist for synergy with capabilities of the CSAR service. We will be continuing this dialogue over coming months.

6.9   Access to Guest Systems

The CSC J90 system remains at present. Work continues with Hewlett-Packard, with a view to CfS providing an HP N-class system; also with Fujitsu in regard to upgrading the present overloaded VPP300 facility.

6.10   ASCI Prototyping Capability

Nothing to report at present.

6.11   Manchester Research Centre for Computational Science (MRCCS)

MRCCS, (Manchester Visualization Centre and the Department of Chemistry) are hosting a summer student programme for 15 students to work on projects in HPC, visualization, data mining and computational chemistry.

The Summer School has been advertised and applications are staring to come in. Frits Post from TU Delft has had to withdraw because of ill health, but Hans-Georg Pagendarm of Deutsche Forschungsanstalt fur Luft- und Raumfahrt, Germany has agreed to take Frits' place at short notice.

The Summer School is open to all. The fee for accommodation, food, and outings will be around £450 for the two weeks. Those associated with projects funded by the Research Councils and using the CSAR service will not be required to pay the school fee of £750. An advert for the Summer School is attached to this document as **Appendix 1.**

Cray User Group has informally agreed that their conference will be in Manchester in 2002.

We have put in a proposal to host Euro-Par 2001 in Manchester, and we wish to record our thanks to EPSRC for their support of our bid.

A JREI bid for a Beowulf cluster led by the Department of Chemistry and in conjunction with Daresbury Lab was recently submitted.

A JREI bid for Visualization and VR equipment led by the Department of Surgery was also recently submitted.

MVC has submitted three proposals under the EU Framework 5.

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Computer Services *for* Academic Research

Appendix 1

MRCCS

Manchester Research Centre for Computational Science

Preliminary Announcement

High Performance Computing Summer School
in
Distributed Memory Programming and Scientific Visualization

6th - 17th September 1999, Manchester

Do you want to use one of the most powerful computers in the world?

Do you want to learn how to programme such a computer?

Do you want to learn how to visualise your results?

Do you want listen to world experts in these areas?

Do you want to meet like-minded people?

Do you want to spend two weeks in Manchester?

Whatever your answers to these questions read on

THE UNIVERSITY
of MANCHESTER

SiliconGraphics
Computer Systems

1 Summer School

This is the first annual two-week residential event being organised by the Manchester Research Centre for Computational Science. It will be a unique opportunity for you to develop skills so that you can make effective use of distributed programming environments, as typified by the Cray T3E, and to learn how to visualise the results of applications run on such supercomputers. You will

- ❑ get to use the most powerful computer available to academia in the world,
- ❑ meet the international experts who will teach you
- ❑ develop contacts with other participants

2 Topics and Format

The preliminary list of topics, to be presented by speakers from Europe and the USA is

❑ Systems & Architectures for Distributed Memory Programming	❑ Distributed Memory programming
❑ Parallel Algorithms for DMP	❑ MPI
❑ Tools for Profiling and Debugging	❑ Parallel Numerical Libraries for DM systems
❑ Systems & architectures for Visualization	❑ Computational Steering
❑ Visualization for Multidimensional & Scientific Data	❑ Visualization of CFD data (an extended case study)

Then format of the school will be an approximate equal mixture of lectures and practical sessions (roughly 20 hours of each). It is expected that students will use the Cray T3E and other machines for the practical sessions, through the extensive computing and visualization facilities of the University of Manchester.
Personal contact and informal discussions amongst the participants, lecturing and support staff during the leisure time are an important aspect of the School.

3 Objectives and Audience

The summer school is designed to show how to maximize productivity in distributed memory distributed memory machines, either highly specialized systems (such as the Cray T3E) or on clusters of workstations and how to visualize their results.

The school is aimed at all graduates, research assistants, and post doctoral research assistants, and industrialists who are thinking of running programs on in such environments, and who need to analyze data from applications run in such an environment.

4 Background

The Manchester Research Centre for Computational Science (MRCCS) is a focus for high performance computing activities the University of Manchester, bringing together research groups of international standing in high performance computing, visualization, data mining and the applications of such technology to a range of scientific problems. The core expertise in these technologies is provided through:

- ❑ Computational Chemistry Group in the Department of Chemistry
- ❑ The Centre for Novel Computing in the Department of Computer Science
- ❑ Manchester Visualization Centre in Manchester Computing
- ❑ Computing Services for Academic Research (CSAR) in Manchester Computing

The core staff of MRCCS is hosted in Manchester Computing, Europe's premier university computing facility supporting world class research and teaching in all disciplines. It consists of two groups: Manchester Visualization Centre and the MRCCS optimisation team. The optimisation team also provides optimisation support to CSAR the new flagship high performance computing service to UK Academia, based around a 576 processor Cray T3E-1200E system, (the fourth most powerful computer in the world), a Silicon Graphics Origin2000 system and a Fujitsu VPP 300. In addition, the University runs a number of other Origin2000 servers as part of its HPC services.

MRCCS in conjunction with CSAR is organising this first annual Summer School, and Silicon Graphics and Computer Sciences Corporation who are members of the consortium providing CSAR are sponsoring the event.

5   Accommodation and Costs

Accommodation will be provided in a University Hall of residence, within easy walking distance of Manchester Computing where the school will be presented. The cost of accommodation, all meals, a conference reception, conference dinner and a number of outings is still to be determined but will be at most £650.

For those who are members of groups funded through the UK Research Councils to use CSAR the course fee is nil. For those who do not fall into this category the course fee will be £750.

6   Further Information

Keep an eye on our web pages: http://www.man.ac.uk/mrccs or http://www.csar.cfs.ac.uk or contact the CSAR helpdesk above.

Cray T3E-1200E PE Hour Demand
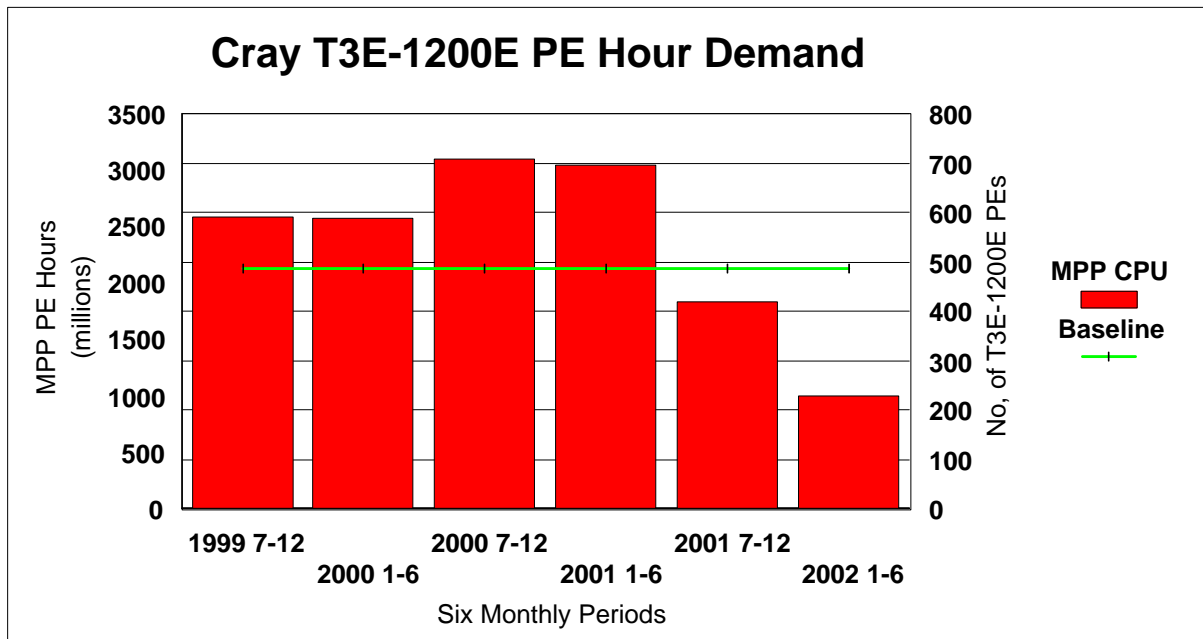
Capacity Planning Summary run on Mon Jul 12 04:00:01 1999 for the CSAR service

Periods:	"1999 7-12"	"2000 1-6"	"2000 7-12"	"2001 1-6"	"2001 7-12"	"2002 1-6"
MPP PE CPU (PEHour)	"Turing"	"Active projects"				
cs2004	0.00	0.00	0.00	0.00	0.00	0.00
cs2005	0.00	0.00	0.00	0.00	0.00	0.00
cs2006	1,400.00	0.00	0.00	0.00	0.00	0.00
cs2007	0.00	0.00	0.00	0.00	0.00	0.00
cs2008	0.00	0.00	0.00	0.00	0.00	0.00
cs3001	2,000.00	10,000.00	3,585.26	0.00	0.00	0.00
cs5003	1,000.00	1,000.00	1,000.00	0.00	0.00	0.00
cs5005	40.00	45.00	60.00	80.00	200.00	0.00
cs5010	4,000.00	0.00	0.00	0.00	0.00	0.00
cse002	150,000.00	0.00	0.00	0.00	0.00	0.00
cse003	163,000.00	267,000.00	435,000.00	296,000.00	0.00	0.00
cse004	120,000.00	200,000.00	280,000.00	280,000.00	0.00	0.00
cse006	555,000.00	555,000.00	555,000.00	505,000.00	0.00	0.00
cse007	80,000.00	50,000.00	46,000.00	45,600.00	0.00	0.00
cse008	135,000.00	0.00	0.00	0.00	0.00	0.00
cse009	180,000.00	0.00	0.00	0.00	0.00	0.00
cse010	666.60	666.60	0.00	0.00	0.00	0.00
cse011	11,250.00	0.00	0.00	0.00	0.00	0.00
cse013	400,000.00	600,000.00	800,000.00	1,000,000.00	1,000,000.00	1,000,000.00
cse014	0.00	0.00	0.00	0.00	0.00	0.00
cse016	25,950.00	25,950.00	25,956.00	25,950.00	25,950.00	0.00
cse017	11,200.00	14,000.00	22,400.00	0.00	0.00	0.00
cse018	27,450.00	27,450.00	13,725.00	0.00	0.00	0.00
cse019	1,500.00	0.00	0.00	0.00	0.00	0.00
cse020	2.00	0.00	0.00	0.00	0.00	0.00
cse021	1,500.00	1,500.00	1,500.00	1,500.00	0.00	0.00
cse022	30,000.00	30,000.00	30,000.00	30,000.00	30,000.00	0.00
cse024	150,000.00	150,000.00	200,000.00	200,000.00	200,000.00	0.00

cse025	1,800.00	0.00	0.00	0.00	0.00	0.00
cse030	80,000.00	80,000.00	80,000.00	80,000.00	80,000.00	0.00
cse033	10,000.00	20,000.00	30,000.00	0.00	0.00	0.00
cse034	49.00	0.00	0.00	0.00	0.00	0.00
csn001	102,848.41	46,000.00	0.00	0.00	0.00	0.00
csn003	50,000.00	0.00	0.00	0.00	0.00	0.00
csn005	46,958.51	0.00	0.00	0.00	0.00	0.00
Total:	2,342,614.52	2,078,611.60	2,524,226.26	2,464,130.00	1,336,150.00	1,000,000.00

MPP PE CPU (PEHour)	"Turing"	"Proposed projects"				
cse035	62,000.00	62,000.00	62,000.00	62,000.00	62,000.00	0.00
cse036	100.00	100.00	100.00	100.00	100.00	0.00
cse037	50,000.00	150,000.00	200,000.00	200,000.00	200,000.00	0.00
cse038	15,000.00	15,000.00	15,000.00	15,000.00	15,000.00	0.00
cse039	8,000.00	8,000.00	8,000.00	8,000.00	8,000.00	0.00
cse040	500.00	1,000.00	1,000.00	1,000.00	1,000.00	0.00
cse041	10,000.00	15,000.00	25,000.00	25,000.00	10,000.00	0.00
cse042	25,000.00	50,000.00	50,000.00	50,000.00	25,000.00	0.00
csp001	70,080.00	140,160.00	157,680.00	157,680.00	175,200.00	0.00
csp002	1,500.00	60,000.00	60,000.00	60,000.00	0.00	0.00
Total:	242,180.00	501,260.00	578,780.00	578,780.00	496,300.00	0.00

SMP CPU (Hour)	"Fermat"	"Active projects"				
cs2004	0.00	0.00	0.00	0.00	0.00	0.00
cs2005	0.00	0.00	0.00	0.00	0.00	0.00
cs2006	0.00	0.00	0.00	0.00	0.00	0.00
cs2007	0.00	0.00	0.00	0.00	0.00	0.00
cs3001	50.00	50.00	2,900.00	954.60	0.00	0.00
cs5003	1,000.00	1,000.00	1,000.00	0.00	0.00	0.00
cs5005	20.00	30.00	40.00	50.00	60.00	0.00
cs5010	0.00	0.00	0.00	0.00	0.00	0.00
cse002	11,213.00	0.00	0.00	0.00	0.00	0.00
cse003	4,100.00	6,700.00	11,000.00	9,000.00	0.00	0.00
cse004	4,000.00	0.00	0.00	0.00	0.00	0.00
cse006	1,000.00	1,000.00	1,000.00	1,089.07	0.00	0.00
cse007	34.00	34.00	31.50	30.00	0.00	0.00
cse009	6,000.00	0.00	0.00	0.00	0.00	0.00
cse013	700.00	700.00	700.00	700.00	700.00	700.00
cse014	0.00	0.00	0.00	0.00	0.00	0.00
cse017	1,120.00	1,400.00	2,240.00	0.00	0.00	0.00
cse019	400.00	0.00	0.00	0.00	0.00	0.00
cse021	100.00	100.00	100.00	100.00	0.00	0.00
cse022	120.00	120.00	120.00	120.00	120.00	0.00
cse024	100.00	200.00	200.00	200.00	200.00	0.00
cse025	1,000.00	0.00	0.00	0.00	0.00	0.00
cse030	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00	0.00
cse033	2.00	18.00	20.05	0.00	0.00	0.00
cse034	120.00	0.00	0.00	0.00	0.00	0.00
csn001	34,984.72	14,800.00	0.00	0.00	0.00	0.00
csn003	300.00	0.00	0.00	0.00	0.00	0.00
csn005	30.00	30.00	0.00	0.00	0.00	0.00
Total:	70,393.72	30,182.00	23,351.55	16,243.67	5,080.00	700.00

SMP CPU (Hour)	"Fermat"	"Proposed projects"				
cse035	2,000.00	2,000.00	2,000.00	2,000.00	2,000.00	0.00
cse036	100.00	100.00	100.00	100.00	100.00	0.00
csp001	500.00	1,000.00	1,100.00	1,100.00	1,200.00	0.00
Total:	2,600.00	3,100.00	3,200.00	3,200.00	3,300.00	0.00

HP Disk (GByteYear)	"Turing"	"Active projects"				
cs2004	0.00	0.00	0.00	0.00	0.00	0.00
cs2005	0.00	0.00	0.00	0.00	0.00	0.00
cs2006	2.00	0.00	0.00	0.00	0.00	0.00
cs2007	0.00	0.00	0.00	0.00	0.00	0.00
cs2008	0.00	0.00	0.00	0.00	0.00	0.00
cs3001	0.02	0.05	0.04	0.00	0.00	0.00
cs5003	2.00	2.00	2.00	2.00	2.00	0.00
cs5005	40.00	60.00	80.00	100.00	120.00	0.00
cse002	164.00	0.00	0.00	0.00	0.00	0.00
cse003	25.00	37.50	37.50	50.00	0.00	0.00
cse004	12.50	20.00	25.00	25.00	0.00	0.00
cse006	5.00	5.00	5.00	5.00	0.00	0.00
cse007	11.00	11.00	11.00	11.00	0.00	0.00
cse008	2.50	0.00	0.00	0.00	0.00	0.00
cse009	40.00	0.00	0.00	0.00	0.00	0.00
cse010	1.00	1.00	0.00	0.00	0.00	0.00
cse011	10.00	0.00	0.00	0.00	0.00	0.00
cse013	20.00	25.00	30.00	35.00	40.00	40.00
cse014	0.00	0.00	0.00	0.00	0.00	0.00
cse016	4.00	4.00	4.00	4.00	4.00	0.00
cse017	3.00	3.00	3.00	0.00	0.00	0.00
cse018	4.00	2.00	0.00	0.00	0.00	0.00
cse019	0.50	0.00	0.00	0.00	0.00	0.00
cse021	0.15	0.15	0.15	0.15	0.00	0.00
cse022	0.50	1.00	1.00	1.00	1.00	0.00
cse024	1.00	1.00	1.00	1.00	1.50	0.00
cse025	0.50	0.00	0.00	0.00	0.00	0.00
cse030	50.00	55.00	60.00	65.00	70.00	0.00
cse033	0.30	0.40	0.50	0.00	0.00	0.00
cse034	0.00	0.00	0.00	0.00	0.00	0.00
csn001	15.00	6.50	0.00	0.00	0.00	0.00
csn003	20.00	0.00	0.00	0.00	0.00	0.00
csn005	7.00	0.50	0.00	0.00	0.00	0.00
csn011	0.50	0.00	0.00	0.00	0.00	0.00
Total:	441.47	235.10	260.19	299.15	238.50	40.00

HP Disk (GByteYear)	"Turing"	"Proposed projects"				
cse035	16.00	16.00	16.00	16.00	16.00	0.00
cse036	0.50	0.50	0.50	0.50	0.50	0.00
cse037	5.00	10.00	10.00	10.00	10.00	0.00
cse038	1.00	1.00	1.00	1.00	1.00	0.00
cse039	2.00	2.00	2.00	2.00	2.00	0.00
cse040	1.00	1.00	1.00	1.00	1.00	1.00
cse041	10.00	10.00	10.00	15.00	15.00	0.00
cse042	2.00	5.00	5.00	7.50	7.50	0.00
csp001	12.50	25.00	30.00	30.00	35.00	0.00
csp002	0.13	0.50	0.50	0.50	0.00	0.00
Total:	50.13	71.00	76.00	83.50	88.00	1.00

MP Disk (GByteYear)	"Fermat"	"Active projects"				
cs2004	0.00	0.00	0.00	0.00	0.00	0.00
cs2005	0.00	0.00	0.00	0.00	0.00	0.00
cs2006	0.00	0.00	0.00	0.00	0.00	0.00
cs2007	0.00	0.00	0.00	0.00	0.00	0.00
cs3001	0.02	0.05	0.03	0.00	0.00	0.00
cs5003	5.00	5.00	5.00	3.30	0.00	0.00

cs5005	10.00	15.00	20.00	25.00	30.00	0.00
cse002	164.00	0.00	0.00	0.00	0.00	0.00
cse003	10.00	15.00	15.00	20.00	0.00	0.00
cse004	7.50	10.00	10.00	15.00	0.00	0.00
cse006	0.50	0.50	0.50	0.50	0.00	0.00
cse007	0.70	0.70	0.70	0.70	0.00	0.00
cse009	5.00	0.00	0.00	0.00	0.00	0.00
cse010	0.50	0.50	0.00	0.00	0.00	0.00
cse011	1.00	0.00	0.00	0.00	0.00	0.00
cse013	20.00	20.00	20.00	20.00	20.00	20.00
cse014	0.00	0.00	0.00	0.00	0.00	0.00
cse016	0.01	0.01	0.09	0.01	0.01	0.00
cse017	3.00	4.00	4.00	0.00	0.00	0.00
cse018	0.00	0.00	0.00	0.00	0.00	0.00
cse019	0.50	0.00	0.00	0.00	0.00	0.00
cse022	0.50	0.50	1.00	1.00	1.50	0.00
cse024	1.00	1.00	1.00	1.00	1.50	0.00
cse025	1.00	0.00	0.00	0.00	0.00	0.00
cse030	150.00	200.00	225.00	250.00	300.00	0.00
cse033	0.05	0.05	0.11	0.00	0.00	0.00
cse034	0.00	0.00	0.00	0.00	0.00	0.00
csn001	11.41	4.00	0.00	0.00	0.00	0.00
csn003	7.00	0.00	0.00	0.00	0.00	0.00
csn005	0.40	0.40	0.00	0.00	0.00	0.00
Total:	399.09	276.71	302.42	336.51	353.01	20.00

MP Disk (GByteYear)	"Fermat"	"Proposed projects"				
cse035	16.00	16.00	16.00	16.00	16.00	0.00
cse036	0.50	0.50	0.50	0.50	0.50	0.00
cse037	35.00	70.00	70.00	70.00	70.00	0.00
cse040	1.00	1.00	1.00	1.00	1.00	1.00
csp001	12.50	25.00	30.00	30.00	35.00	0.00
csp002	0.25	1.50	2.50	2.50	0.00	0.00
Total:	65.25	114.00	120.00	120.00	122.50	1.00

HSM/Tape (GByteYear)	"Fermat"	"Active projects"				
cs2006	0.00	0.00	0.00	0.00	0.00	0.00
cs2007	0.00	0.00	0.00	0.00	0.00	0.00
cs3001	0.00	0.00	0.00	0.00	0.00	0.00
cs5003	30.00	30.00	30.00	30.00	17.70	0.00
cs5005	100.00	150.00	200.00	250.00	300.00	0.00
cse002	1,536.00	0.00	0.00	0.00	0.00	0.00
cse003	125.00	150.00	175.00	200.00	0.00	0.00
cse004	37.50	62.50	62.50	87.50	0.00	0.00
cse009	20.00	0.00	0.00	0.00	0.00	0.00
cse011	100.00	0.00	0.00	0.00	0.00	0.00
cse013	50.00	55.00	65.00	75.00	80.00	100.00
cse016	30.00	30.00	30.00	30.00	30.00	0.00
cse017	20.00	30.00	40.00	0.00	0.00	0.00
cse018	30.50	15.25	0.00	0.00	0.00	0.00
cse030	200.00	400.00	600.00	800.00	1,000.00	0.00
csn001	860.00	430.00	0.00	0.00	0.00	0.00
csn003	1,500.00	0.00	0.00	0.00	0.00	0.00
csn005	12.00	3.00	0.00	0.00	0.00	0.00
Total:	4,651.00	1,355.75	1,202.50	1,472.50	1,427.70	100.00

HSM/Tape (GByteYear)	"Fermat"	"Proposed projects"				
cse039	0.00	0.00	0.00	0.00	0.00	0.00

cse040		1.00	1.00	1.00	1.00	1.00	1.00
cse042		0.00	10.00	10.00	25.00	25.00	0.00
csp001		250.00	500.00	550.00	625.00	625.00	0.00
Total:		251.00	511.00	561.00	651.00	651.00	1.00
J90 MP Disk (GByteYear)	"J90"	"Active projects"					
Total:		0.00	0.00	0.00	0.00	0.00	0.00
J90 MP Disk (GByteYear)	"J90"	"Proposed projects"					
Total:		0.00	0.00	0.00	0.00	0.00	0.00
J90 CPU (Hour)	"J90"	"Active projects"					
Total:		0.00	0.00	0.00	0.00	0.00	0.00
J90 CPU (Hour)	"J90"	"Proposed projects"					
Total:		0.00	0.00	0.00	0.00	0.00	0.00
VPP_CPU (Hour)	"Fuji"	"Active projects"					
csn001		540.00	290.00	0.00	0.00	0.00	0.00
Total:		540.00	290.00	0.00	0.00	0.00	0.00
VPP_CPU (Hour)	"Fuji"	"Proposed projects"					
Total:		0.00	0.00	0.00	0.00	0.00	0.00
Support (PersonDay)	"Fermat"	"Active projects"					
cs2005		0.00	0.00	0.00	0.00	0.00	0.00
cs2007		0.00	0.00	0.00	0.00	0.00	0.00
cs5005		2.00	3.00	4.00	5.00	6.00	0.00
cse002		73.00	0.00	0.00	0.00	0.00	0.00
cse003		6.00	6.00	6.00	4.00	0.00	0.00
cse004		0.00	0.00	0.00	0.00	0.00	0.00
cse006		3.00	3.00	2.00	2.00	2.00	0.00
cse007		5.00	4.00	5.00	4.00	0.00	0.00
cse008		7.00	0.00	0.00	0.00	0.00	0.00
cse009		0.00	0.00	0.00	0.00	0.00	0.00
cse010		2.00	2.00	0.00	0.00	0.00	0.00
cse011		1.00	0.00	0.00	0.00	0.00	0.00
cse013		30.00	30.00	30.00	15.00	15.00	15.00
cse014		0.00	0.00	0.00	0.00	0.00	0.00
cse017		2.00	0.00	0.00	0.00	0.00	0.00
cse024		10.00	10.00	10.00	0.00	0.00	0.00
cse030		20.00	20.00	20.00	20.00	20.00	0.00
cse033		0.00	0.00	0.00	0.00	0.00	0.00
csn001		8.20	4.00	0.00	0.00	0.00	0.00
csn005		12.00	0.00	0.00	0.00	0.00	0.00
Total:		181.20	82.00	77.00	50.00	43.00	15.00
Support (PersonDay)	"Fermat"	"Proposed projects"					
cse040		4.00	4.00	4.00	0.00	0.00	0.00
cse041		2.00	0.00	0.00	0.00	0.00	0.00
csp002		0.00	0.00	1.00	0.00	0.00	0.00
Total:		6.00	4.00	5.00	0.00	0.00	0.00

Training (Day)	"Fermat"	"Active projects"				
cs2005	0.00	0.00	0.00	0.00	0.00	0.00
cs2007	0.00	0.00	0.00	0.00	0.00	0.00
cs2008	0.00	0.00	0.00	0.00	0.00	0.00
cs3001	0.00	1.00	0.00	0.00	0.00	0.00
cse002	9.00	0.00	0.00	0.00	0.00	0.00
cse003	12.00	12.00	12.00	6.00	0.00	0.00
cse004	0.00	0.00	0.00	0.00	0.00	0.00
cse007	3.00	3.00	3.00	3.00	0.00	0.00
cse009	0.00	0.00	0.00	0.00	0.00	0.00
cse010	1.00	1.00	0.00	0.00	0.00	0.00
cse011	0.50	0.00	0.00	0.00	0.00	0.00
cse013	10.00	10.00	5.00	5.00	5.00	0.00
cse017	1.00	0.00	0.00	0.00	0.00	0.00
cse024	5.00	5.00	5.00	0.00	0.00	0.00
cse030	12.00	8.00	8.00	8.00	8.00	0.00
cse033	0.00	0.00	0.00	0.00	0.00	0.00
csn001	6.00	3.99	0.00	0.00	0.00	0.00
csn003	4.00	0.00	0.00	0.00	0.00	0.00
Total:	63.50	43.99	33.00	22.00	13.00	0.00

Training (Day)	"Fermat"	"Proposed projects"				
cse038	3.00	3.00	0.00	0.00	0.00	0.00
cse039	4.00	1.00	1.00	1.00	1.00	0.00
cse041	1.00	0.00	0.00	0.00	0.00	0.00
csp001	1.50	3.00	3.00	3.00	3.00	0.00
csp002	2.00	0.00	0.00	0.00	0.00	0.00
Total:	11.50	7.00	4.00	4.00	4.00	0.00