



## **Consolidated Management Report**

**1<sup>st</sup> Quarter 1999**

**CfS/MB/P/99/7**

# CSAR Service

## Consolidated Management Report

### 1<sup>st</sup> Quarter 1999

#### Management Summary

The CSAR Service went live on 16<sup>th</sup> November 1998 and was officially launched in December by Lord Sainsbury, Minister of Science. The formal Go-Live Date is 1<sup>st</sup> January 1999.

The Service currently contains the single, most powerful computer for academic work in Europe, namely Turing the Cray T3E-1200E/576.

In this, the first quarter of actual production use, the Service has achieved all of the Service Quality Targets, and the numbers of registered users has risen steadily. The usage of the system is currently running close to the baseline for the system.

The system continues to be improved to meet the requirements of the user community, some of which are highlighted below:

- Increased throughput of larger jobs.
- Increased throughput of interactive work.
- Increased speed and additional functionality of Project Management via the web based user interface.
- Increasing uptake of Applications and Optimisation Support  
( PI Quote: "some of the imaginative things you're proposing can be exploited". )

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

#### 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 and 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
<b>HPC Services Availability</b>						
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
<b>Help Desk</b>						
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
<b>Others</b>						
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
<b>HPC Services Availability</b>									
Availability in Core Time (% of time)	99.99%	97.20%	99.70%	100%	100%				
Availability out of Core Time (% of time)	98.53%	98.41%	100%	99.40%	98.51%				
Number of Failures in month	2	5	1	3	1				
Mean Time between failures in 52 week rolling period (hours)	400	174.1	744	354	432				
<b>Help Desk</b>									
Non In-depth Queries - Maximum Time to resolve 50% of all queries (working days)	1	<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	<1				
Administrative Queries - Maximum Time to resolve 95% of all queries (working days)	2	<1	<1	<3	<1				
Help Desk Telephone - % of calls answered within 2 minutes	100%	100%	100%	100%	100%				
<b>Others</b>									
Normal Media Exchange Requests - average response time in month (working days)	0.5	0	<0.5	0	<0.5				
New User Registration Time (working days)	2	0	<2	0	0				
Management Report Delivery Times (working days)	10	10	10	10	10				
System Maintenance - no. of scheduled sessions taken per system in the month	4	1	2	2	2				

**Table 2**

#### Notes:

- HPC Services Availability has been calculated using the following formulae, based on the relative NPB performance of Turing and Fermat:  

$$[ \text{Turing availability} \times 122 / (122 + 3.5) ] + [ \text{Fermat availability} \times 3.5 / (122 + 3.5) ]$$
- 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
<b>HPC Services Availability</b>									
Availability in Core Time (% of time)	-0.058	0.078	-0.039	-0.058	-0.058				
Availability out of Core Time (% of time)	0.000	0.039	-0.047	0.000	0.000				
Number of Failures in month	0.000	0.016	-0.008	0.000	-0.008				
Mean Time between failures in 52 week rolling period (hours)	0.000	0.016	-0.009	0.000	0.000				
<b>Help Desk</b>									
Non In-depth Queries - Maximum Time to resolve 50% of all queries (working days)	0.000	-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	-0.016	-0.016				
Administrative Queries - Maximum Time to resolve 95% of all queries (working days)	0.000	-0.016	-0.016	0.016	-0.016				
Help Desk Telephone - % of calls answered within 2 minutes	-0.004	-0.004	-0.004	-0.004	-0.004				
<b>Others</b>									
Normal Media Exchange Requests - average response time in month (working days)	-0.002	0.000	-0.002	0.000	-0.002				
New User Registration Time (working days)	0.000	0.000	0.000	0.000	0.000				
Management Report Delivery Times (working days)	0.000	0.000	0.000	0.000	0.000				
System Maintenance - no. of scheduled sessions taken per system in the month	0.006	-0.003	0.000	0.000	0.000				
Monthly Total & overall Service Quality Rating for each period:	-0.01	0.08	-0.08	-0.04	-0.06	0.00	0.00	0.00	0.00
Quarterly Service Credits:						-0.18			

**Table 3**

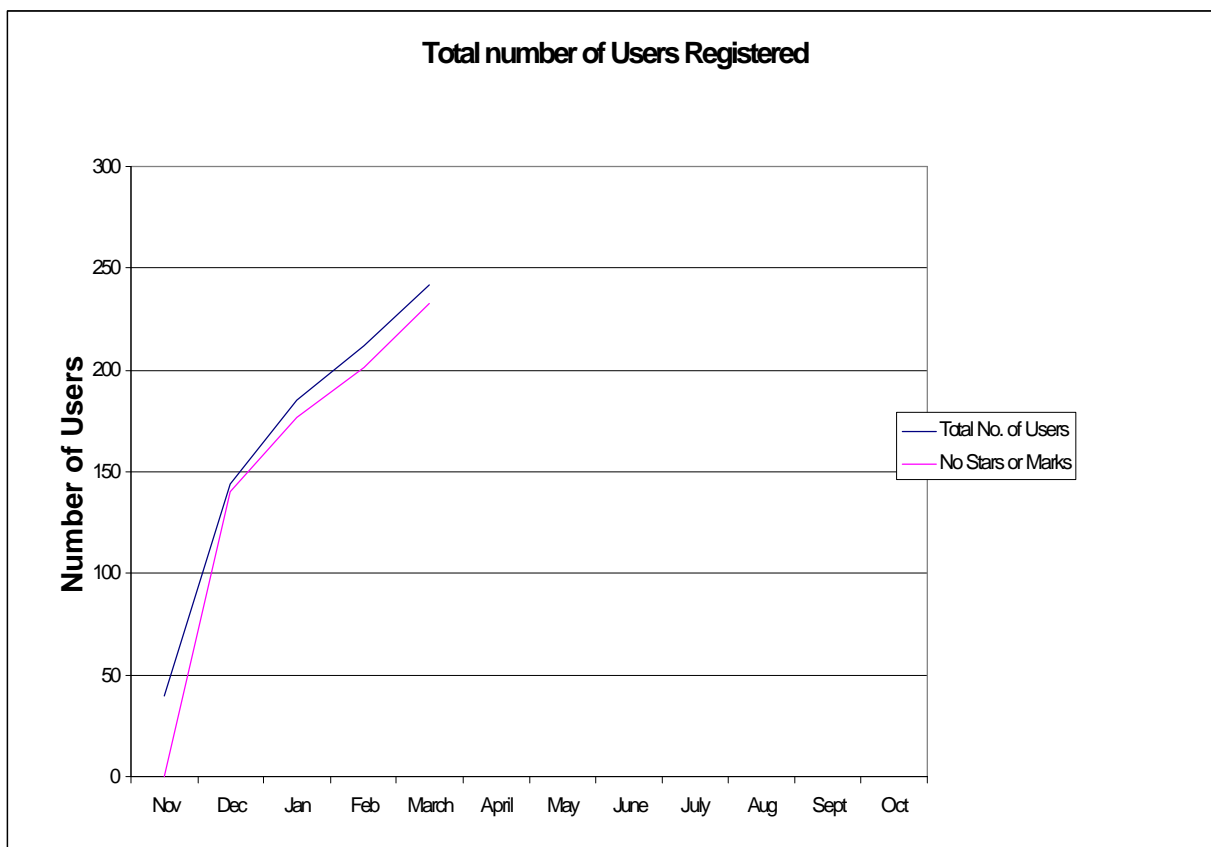
The Quarterly Service Credit for the first quarter from the Go-Live Date is -0.18%, i.e. the total accrued service credits for the three months in the period.

### 1.2 Service Quality Tokens

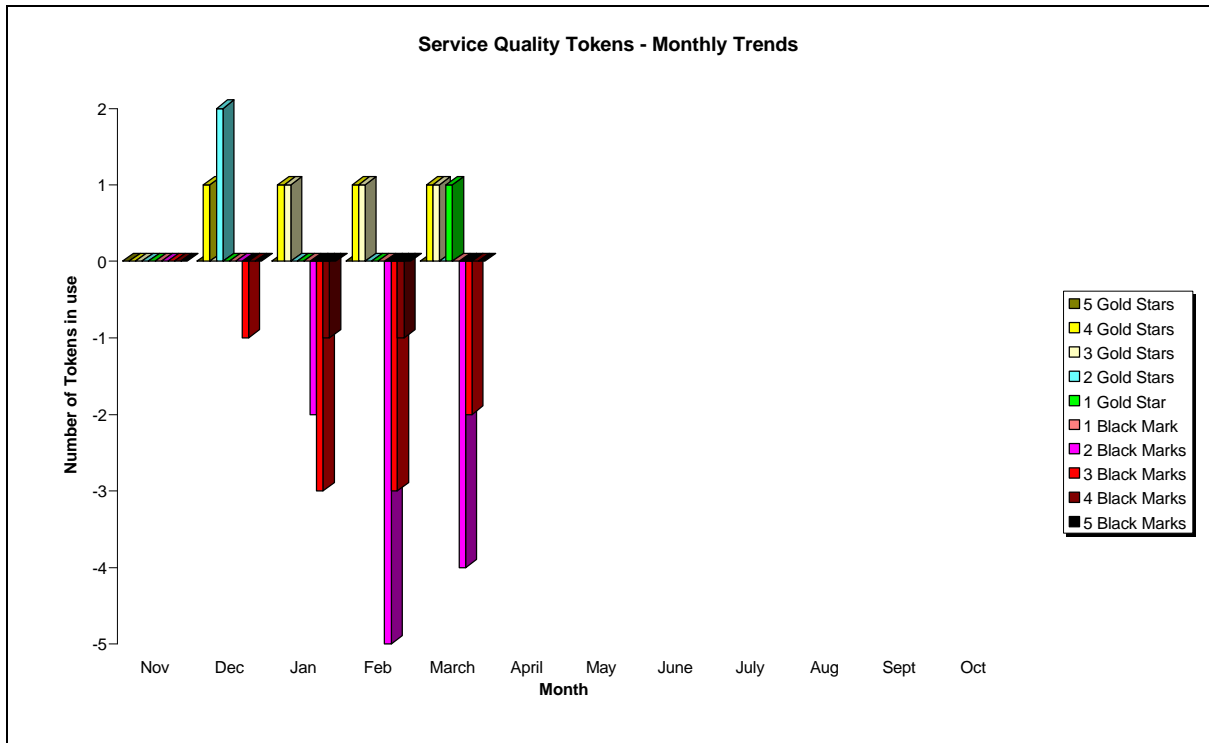
The current position at the end of the quarter is that 9 of the 242 registered users of the CSAR Service had used Service Quality Tokens. See below:

### Service Quality Tokens

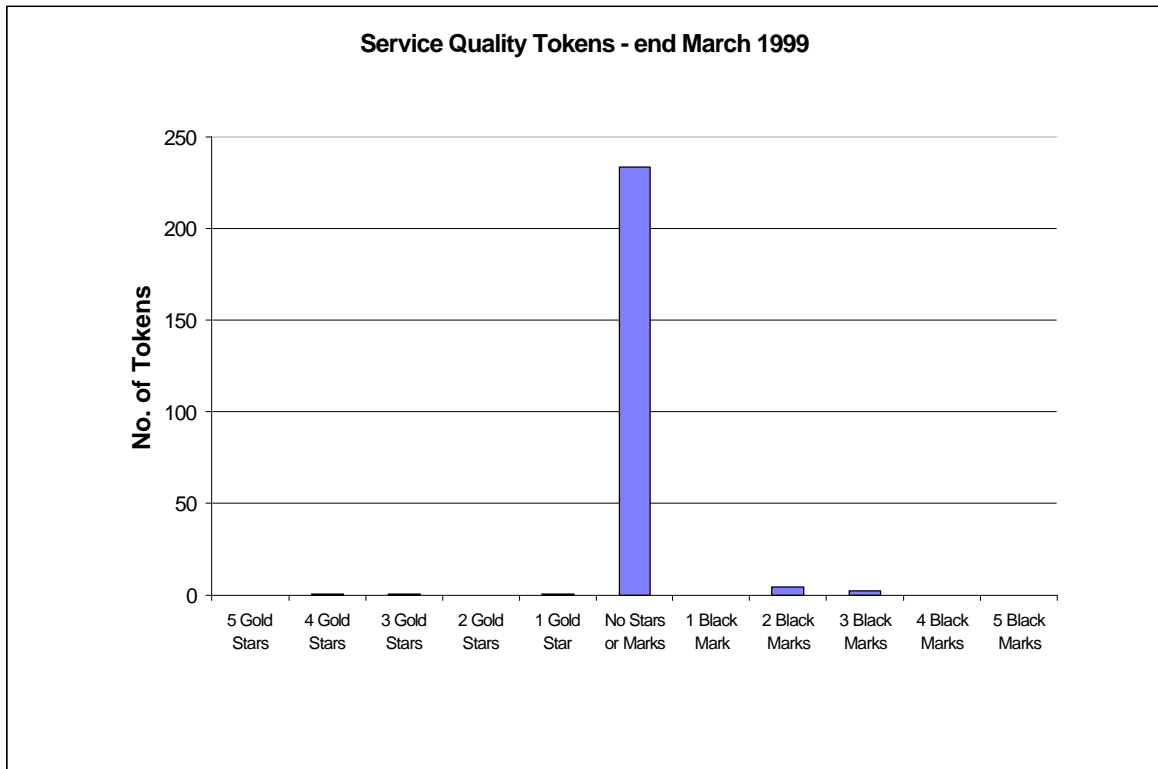
	Position as at end of each month											
	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct
5 Gold Stars	0	0	0	0	0							
4 Gold Stars	0	1	1	1	1							
3 Gold Stars	0	0	1	1	1							
2 Gold Stars	0	2	0	0	0							
1 Gold Star	0	0	0	0	1							
No Stars or Marks	0	140	177	201	233							
1 Black Mark	0	0	0	0	0							
2 Black Marks	0	0	2	5	4							
3 Black Marks	0	1	3	3	2							
4 Black Marks	0	0	1	1	0							
5 Black Marks	0	0	0	0	0							



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



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.

## 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

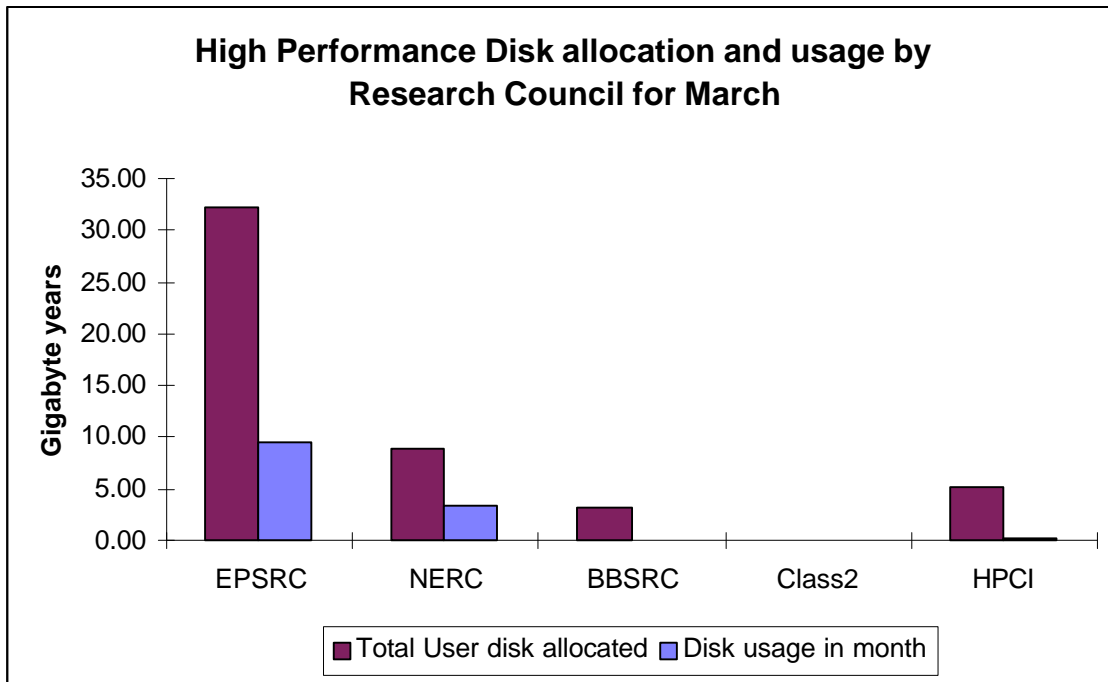
In addition, the following graphs are provided to illustrate usage per month, historically:

- 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.

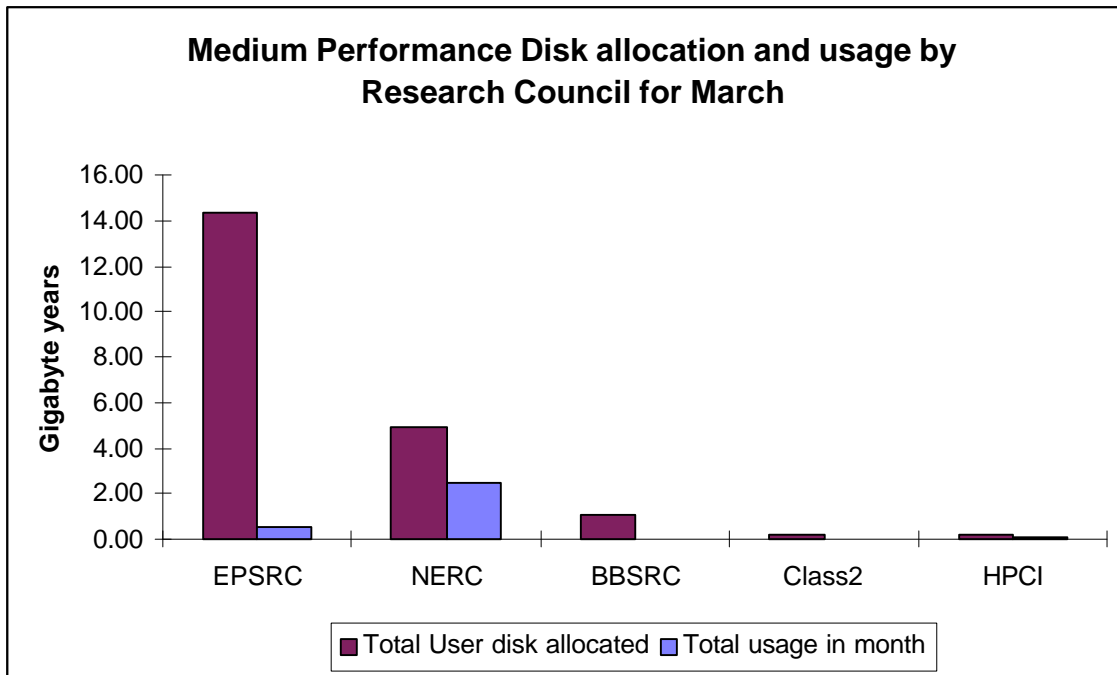


## 2.1 Disk/HSM Usage Charts

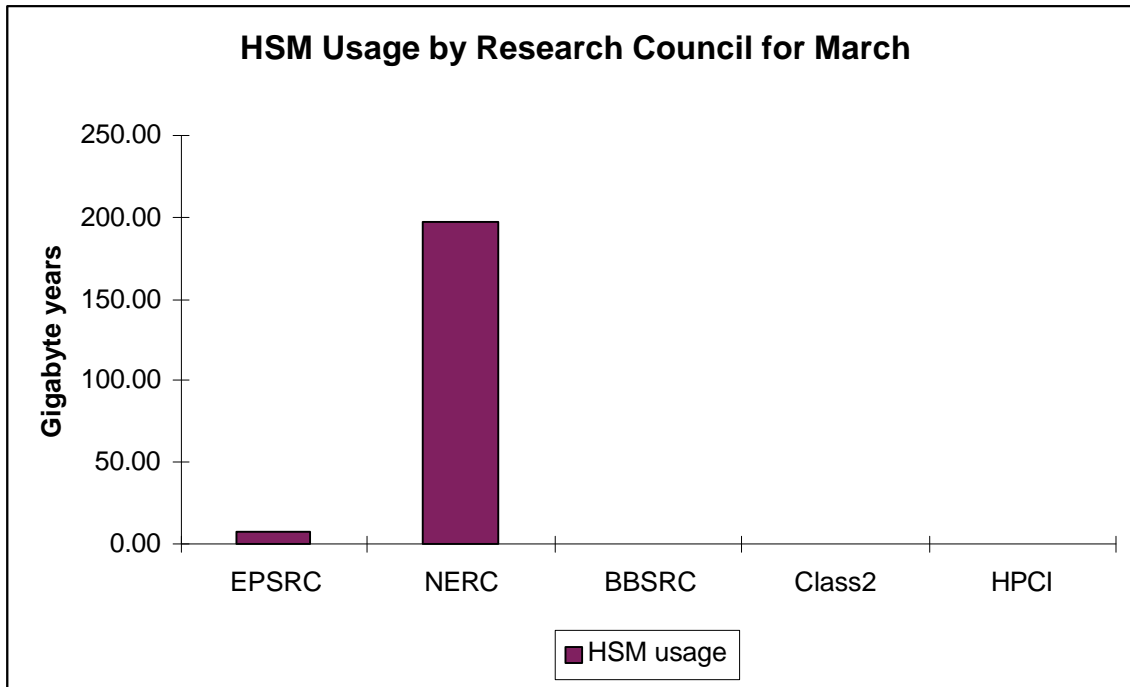
The graphs below show current monthly disk and HSM allocations and usage.



The preceding graph shows actual usage in March against the current allocation of disk on the Turing system.

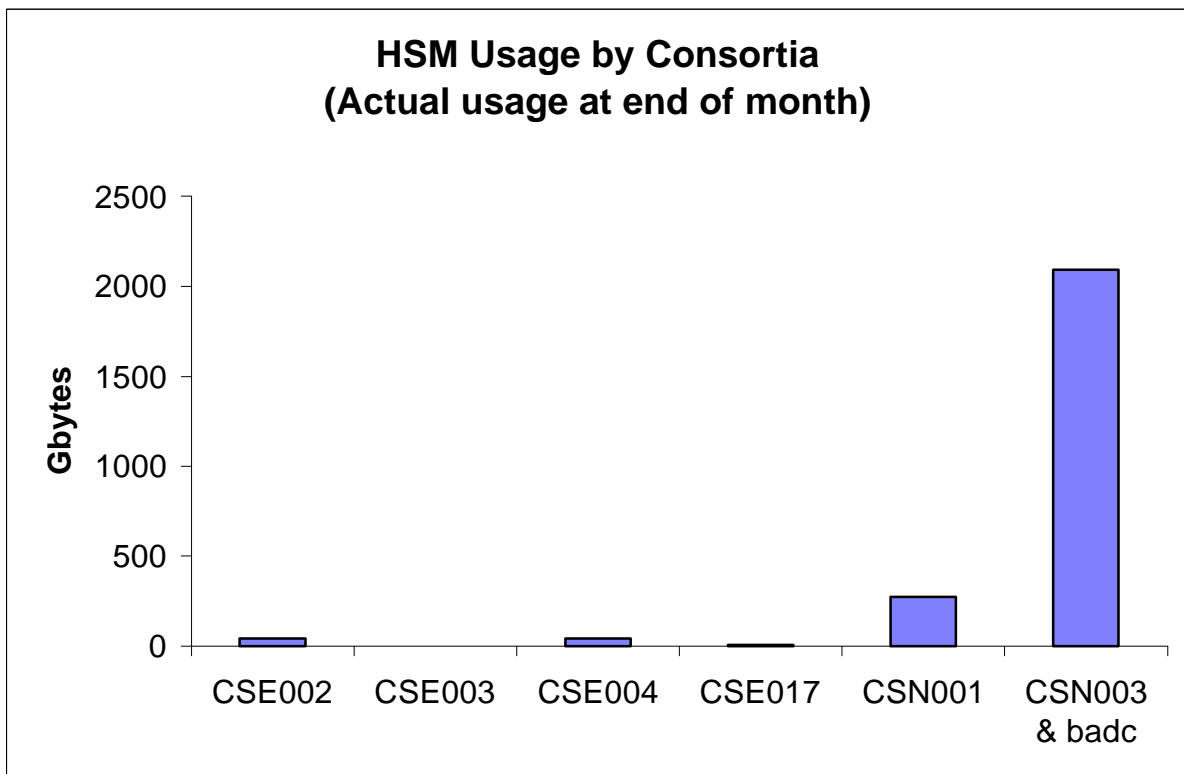
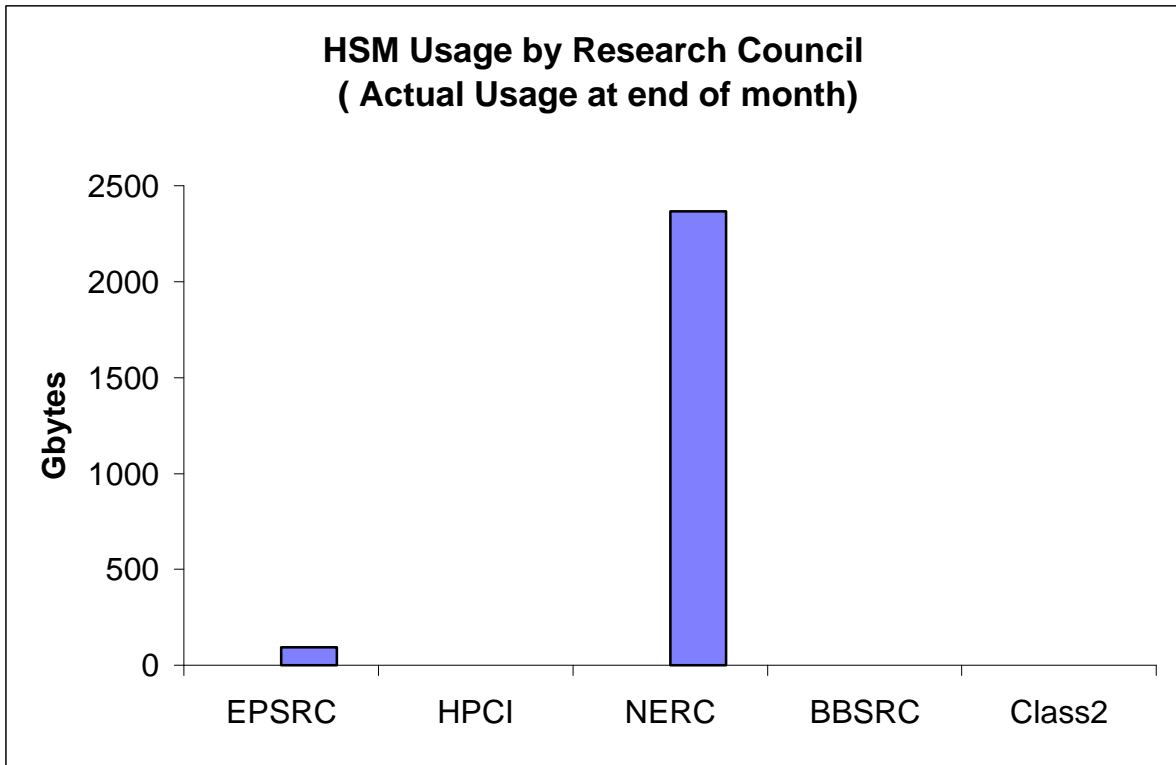


The above graph shows the disk allocations against usage of the disk on Fermat during March.

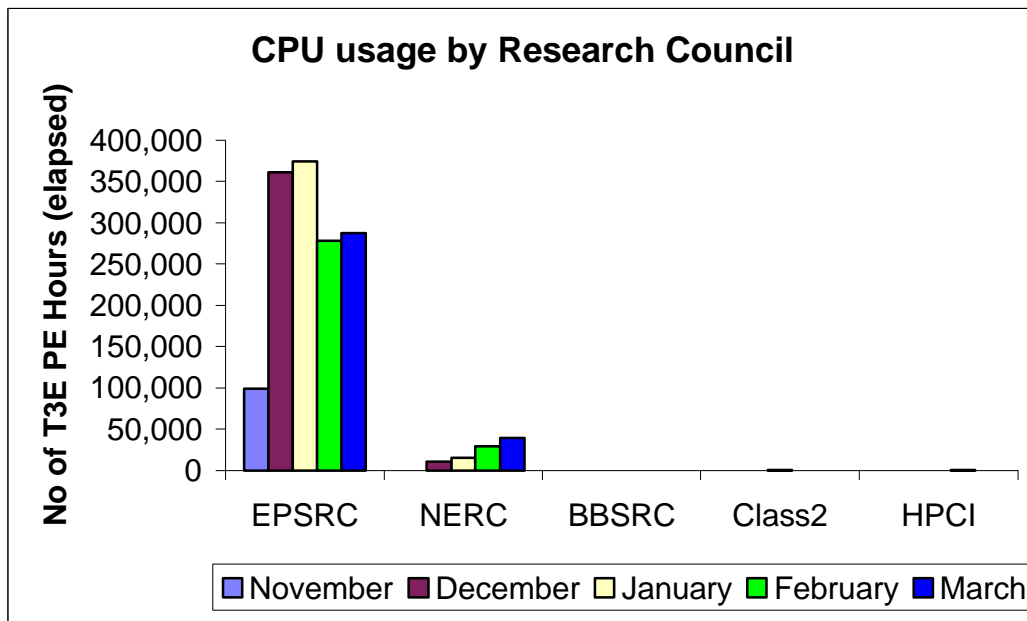


The above graph shows the total usage of the HSM facility by Research Council during March.

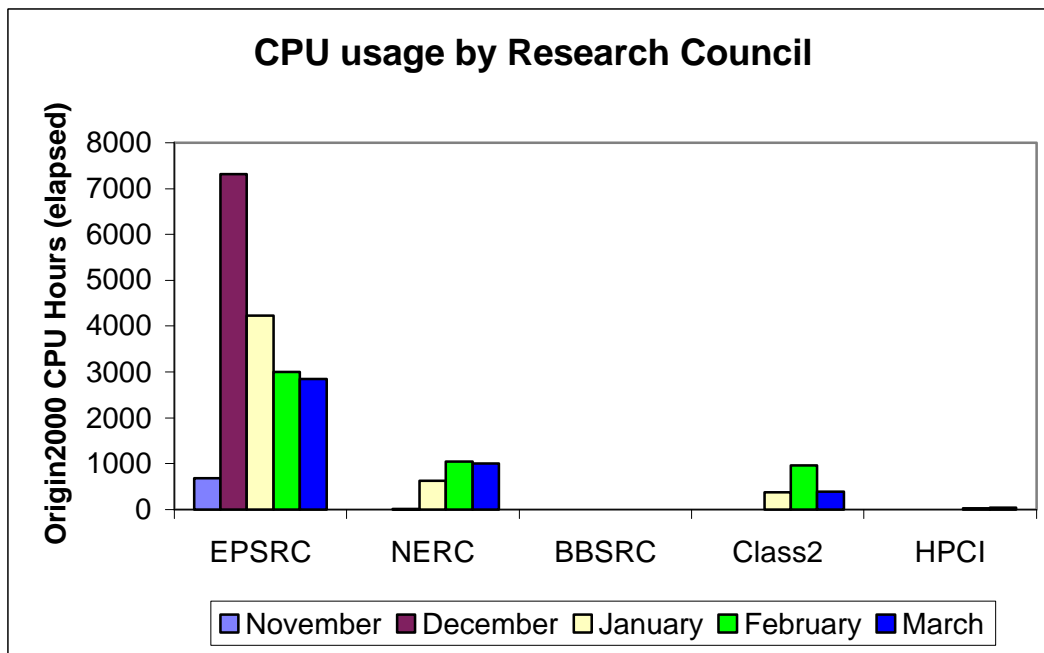
The next two graphs give actual usage of HSM by Research Council and by Consortium as at end March.



The graph below shows the CPU usage by Research Council during the months of service.



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



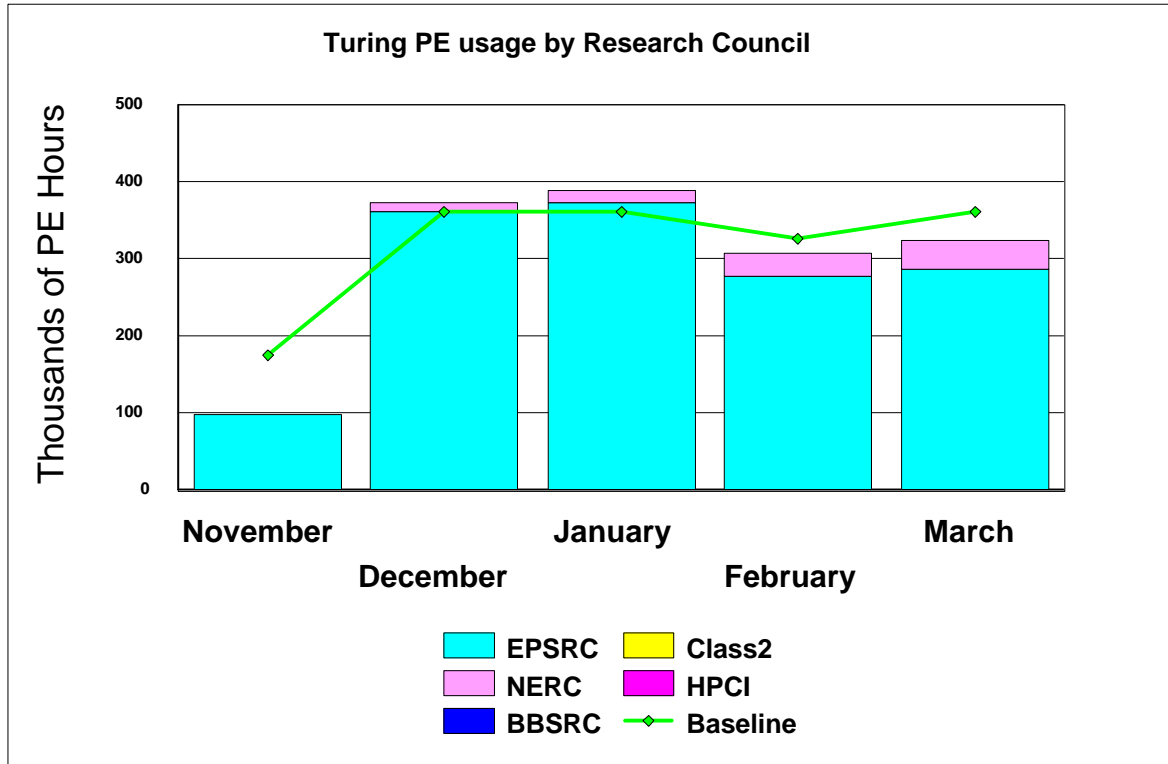
Origin2000 CPU usage is shown by Research Council during the months of service to date in the above chart.

## 2.2 Historic Usage Charts

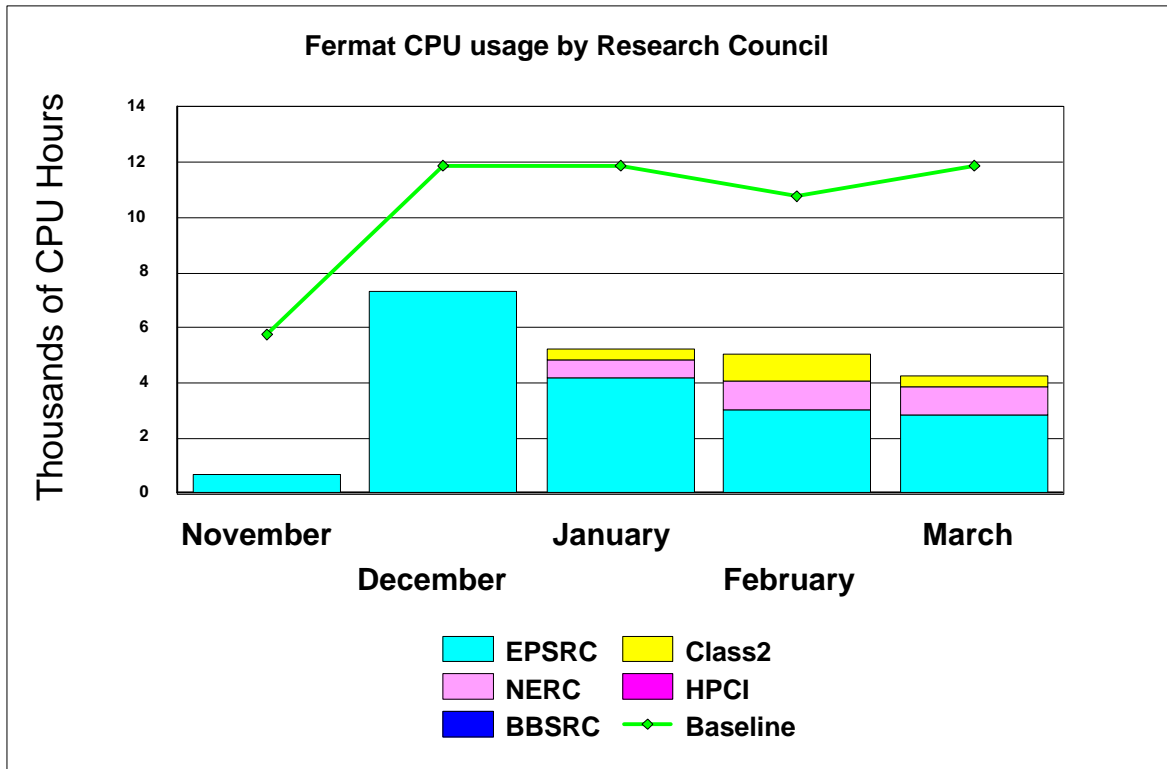
### 2.2.1 Baseline System Usage Graphs

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.

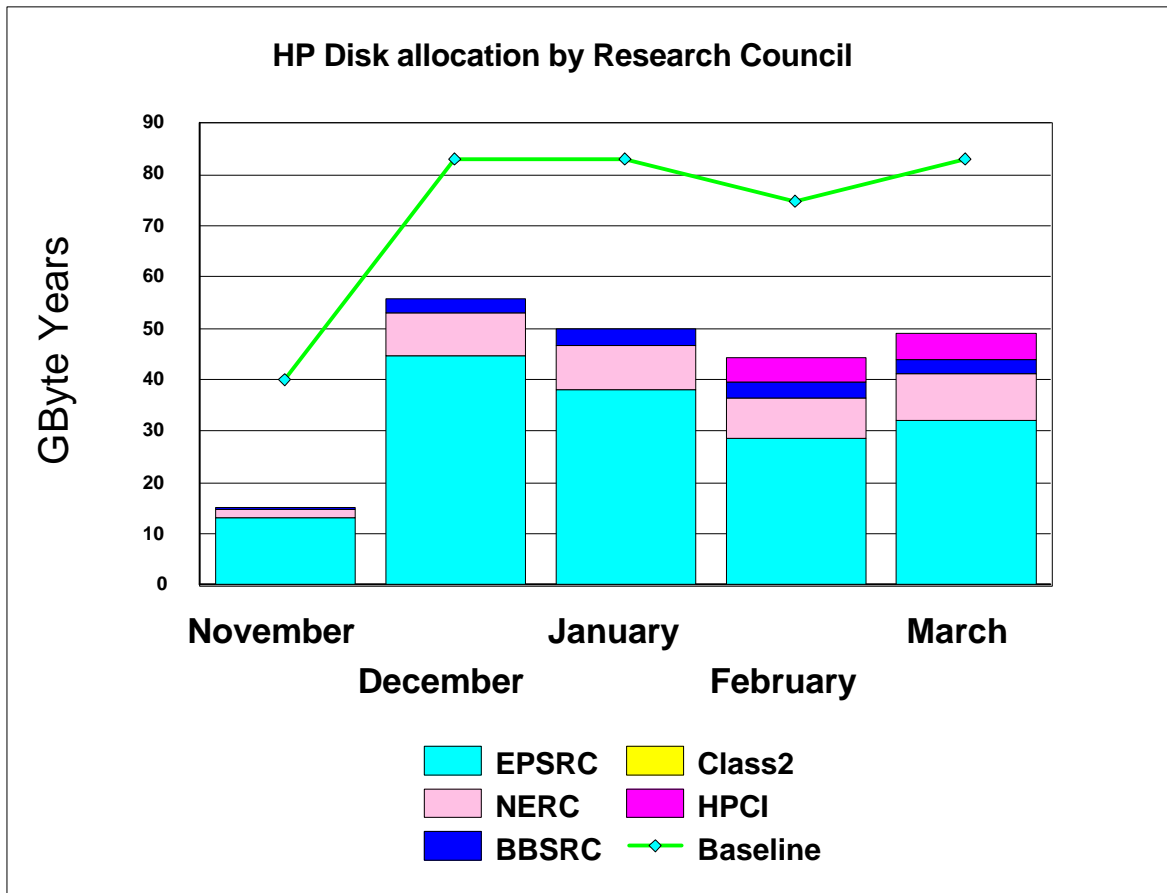
The graph below shows the PE hour's utilisation on Turing by Research Council from November.



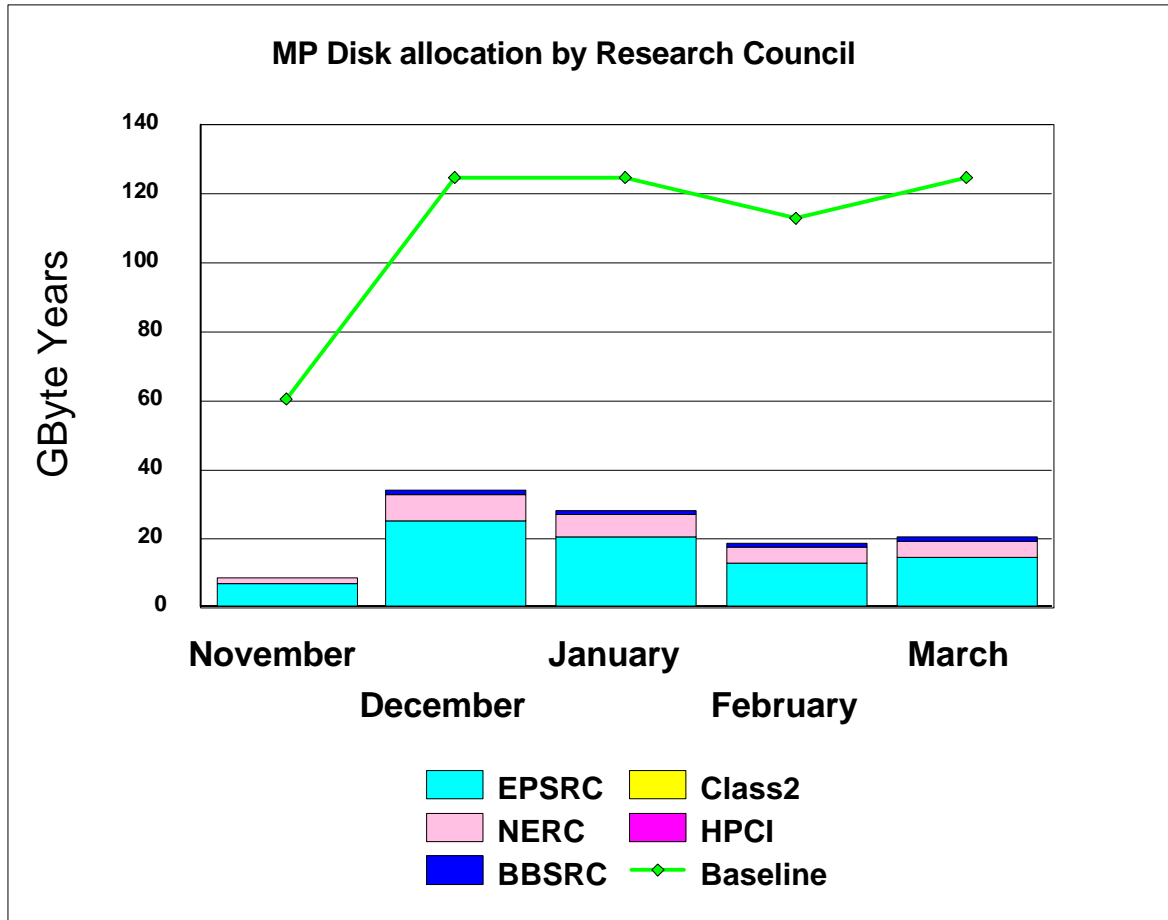
The graph below shows the historic CPU usage on Fermat by Research Council from November.



The next series of graphs illustrates the usage of the disk and HSM resources of the system.

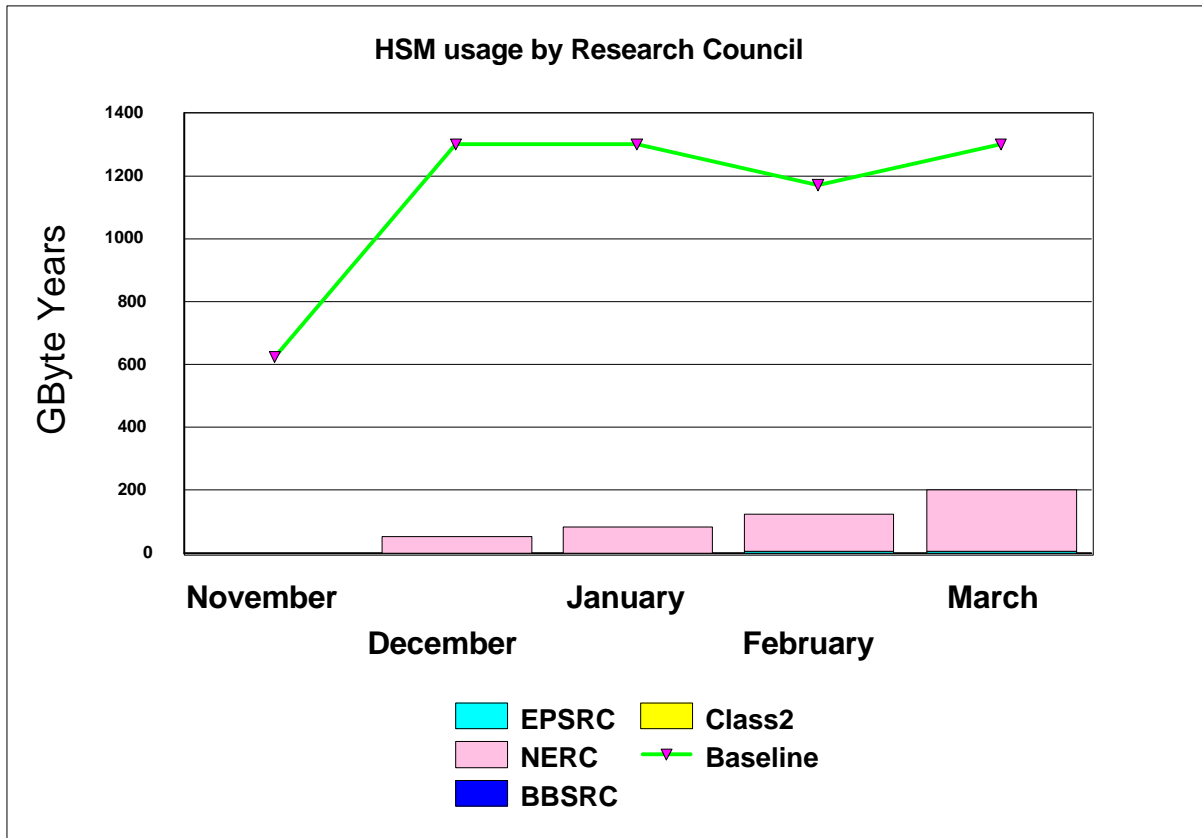


The preceding graph illustrates the historic allocation of the High Performance Disk on Turing.

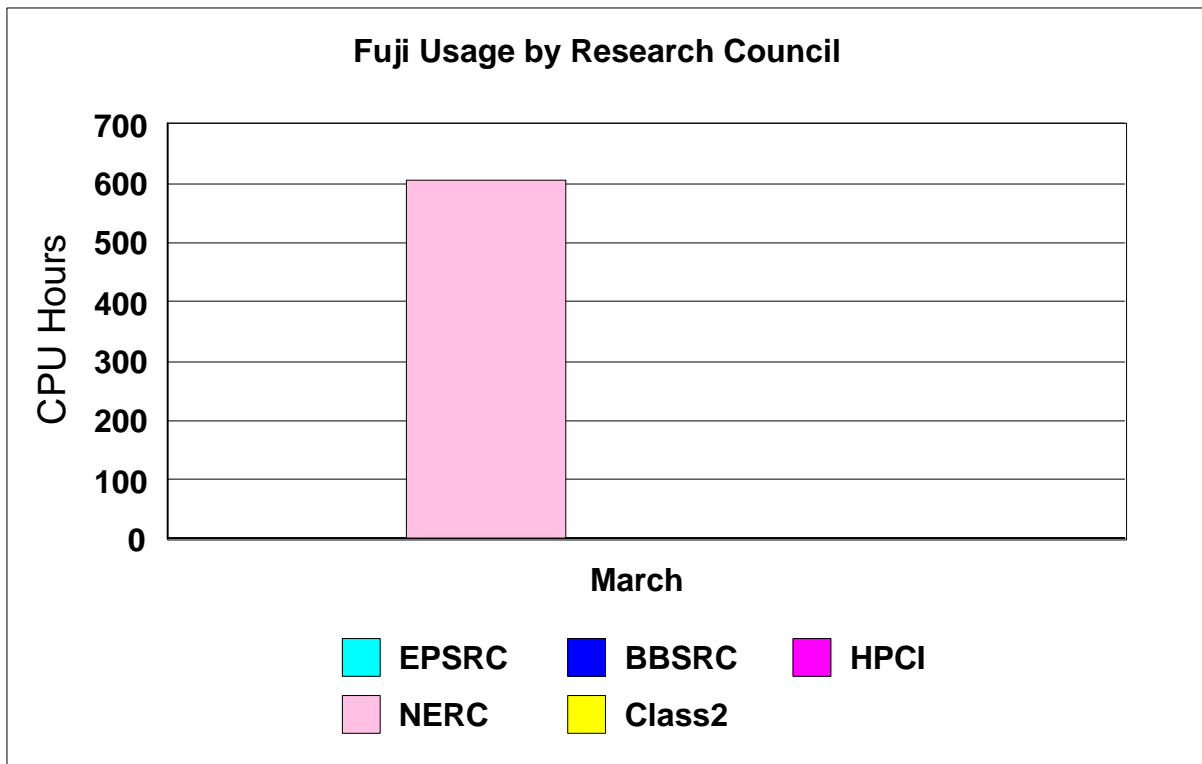


The graph above illustrates the historic allocation of the Medium Performance Disk on Fermat.

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

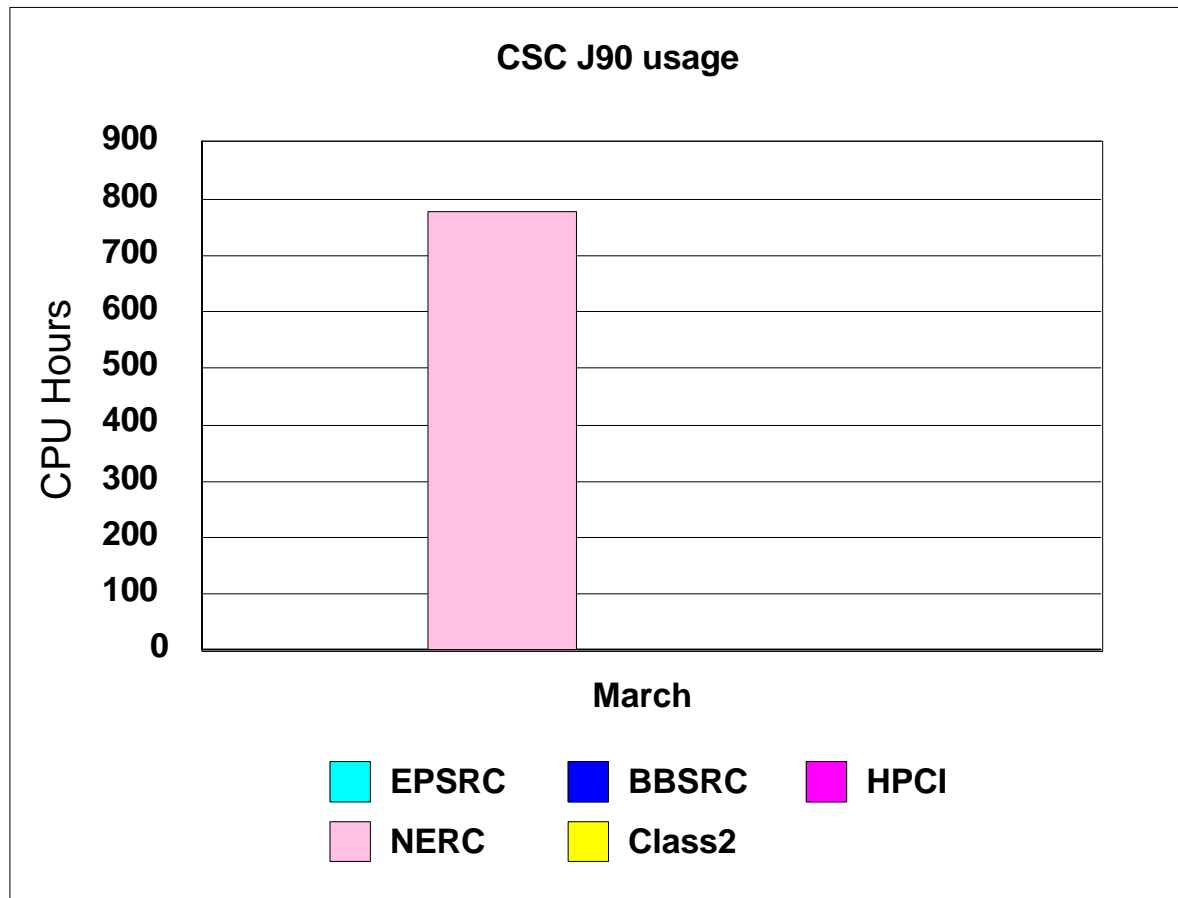


2.2.2 Guest System Usage Graphs





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



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 the systems are now settled in and stable. The T3E is now running UNICOS 2.04 which provides for additional features, such as the ability to run single PE batch jobs more effectively. The Origin2000 is scheduled to be upgraded to IRIX 6.5.3 during April.

### Issues

The introduction of the Sub Consortia facility has been an issue with some users as can be seen by the Service quality tokens. This facility will be in place shortly as below.

### Plans

The Introduction of the new Sub Consortia facility is planned for implementation in April along with the Capacity Planning facility via the web.

It is also planned to introduce a new Tape Management Facility to enable greater flexibility within the Archive system, which will in turn provide improved response times. This facility is currently being tested on the 3490 drives in the silo. Once TMF has been evaluated on these drives it will be introduced on the Redwood drives currently being used by the Veritas backup software and DMF, the Hierarchical Storage management software.

### 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

All consortia have been allocated a named CSAR liaison contact person from the applications/optimisation staff team, and initial contact has been made with all consortia to enquire about their support requirements. Preliminary discussions for specific support are currently underway with various consortia – arrangements are being made to visit and discuss support requirements with the UK Turbulence Consortium led by Dr Neil Sandham at the University of Southampton, and the Complex Fluids Consortium under Professor Cates at the University of Edinburgh.

Some specific optimisation work has started with the UKCP Consortium which has purchased 146 person days of support for 1999. The consortium is developing a new code and wishes to obtain optimal performance on the Cray T3E. The original version of a computational kernel for the code ran at about 50 Mflops on a single PE, but optimisation work by CSAR staff has already improved this by a factor of about six. Further discussions are underway to decide the next stage of the work following on from the PI expressing the view “you have made gratifying progress”.

#### 3.2 Training Courses

A wide range of courses has been offered during this period. These include CSAR specific courses such as the Cray T3E optimisation course, visualization courses and more general courses relevant to users of all HPC systems, including AVS Express, Digital Video, Java, Fortran 90 and C++ for HPC. Further, courses related to developing technology are of increasing interest - the OpenMP course scheduled for 1st April has 13 attendees registered. Such courses are of particular interest as they are likely to appeal to potential CSAR users. The development of new courses is particularly time consuming and has inevitably been a major activity of CSAR staff in the early months of the service.

In general the attendance by CSAR users at courses during this period has not been good. Of the CSAR specific courses only the Fujitsu VPP course had sufficient participants to be given. In contrast most of the visualization and general HPC courses have taken place. It is thought that the major reason for the lack of take up of training is that most of the consortia currently using the CSAR service have transferred existing work from the Cray systems at Edinburgh, so they already have familiarity with using a Cray MPP system. It is expected however that there will be increasing demand and attendance on the courses for a number of reasons:

- New consortia, without Cray MPP experience, are now being registered.
- Existing consortia will be developing new codes and employing new staff.
- Increasing contact between CSAR staff and the user community will increase awareness of the user requirements and the benefits that can be attained via training courses.
- The charges for attendance have recently been reduced significantly in consultation with EPSRC.

Nevertheless proactive steps are being taken to improve the attendance at existing courses and/or to provide courses more suited to the needs of the CSAR community. These include:

- Better advertisement.
- Adaptation of courses for specific requirements (as is currently being done for the Met Office).
- Delivery of courses at remote sites (a course will shortly be given at Cranfield Institute of Technology).
- Development of application specific workshops (a computational chemistry workshop is being developed jointly with Daresbury Laboratory for September 1999).

A discussion paper on training issues was presented at the User Liaison Forum recently.

### 3.3 Installation of applications (and other) software

- The Nag Library on turing has been updated from Mark 17 to Mark 18.
- The ARPACK library for solving large scale eigenvalue problems, and the parallel implementation, PARPACK, have been made available on turing.
- The Cray Benchlib Library for T3E code optimisation has been installed.
- A Fortran 90 interface to the linear algebra library, LAPACK, is being installed.
- The computational chemistry package, DGauss, has been installed on turing, and the Unichem GUI (used for accessing DGauss) on fermat. This software was purchased by one consortium, so is not available for general use.
- The public domain chemistry package, NWChem, is being obtained and will be made available for general use (to be confirmed).
- The scripting language Perl has been installed on turing.
- The Concurrent Version System (CVS) for managing different versions of files has been installed on turing.

### 3.4 Collaboration with HPCi Centres

CSAR hosted a meeting between CSAR applications and optimisation staff and Daresbury HPCi in January. This was to discuss potential area where the two groups could collaborate and coordinate their support of CSAR users. Areas identified were:

- Support of quantum chemistry packages.
- Support of materials science packages.
- Workshops on HPC algorithms and techniques.
- Discussions on support of Environmental Science and Computational Fluid Dynamics.

Following on from the meeting above, further meetings have taken place specifically to discuss support of quantum chemistry and materials science packages. A work schedule has been produced resulting in involvement in the UKCP/MSI workshop on 9th/10th April, and in organising a joint workshop in September. A meeting is planned to discuss the efficient implementation of Fast Fourier Transforms; the meeting will be at Daresbury and representatives from all HPCi Centres have been invited.

A visit was made to the Southampton HPCi and the OCCAM consortium on 8th/9th March, and informal contacts were made with Edinburgh HPCi at an HPCi seminar in March.

### 3.5 Visits to consortia and other potential users

- CSAR and MVC staff visited Huw Davies of the Terra consortium on February 18th, to discuss the visualization of data from the recent 512 processor CSAR jobs run by the Terra group.
- OCCAM Consortium members were visited at the University of Southampton on March 8th/9th.
- CSAR staff attended a collaborative meeting between the Chemreact 98 Consortium and the Computational Combustion Consortium at University College London on March 10th.
- A presentation on the CSAR service to NERC researchers was given at the Proudman Oceanographic Laboratories on March 17th.
- A visit was made to the UK Car Parrinello Consortium in University College London on 22nd March, to discuss optimisation support.

### **3.6 Novel techniques/applications development**

There are a large number of Class 3 projects on the SGI Origin2000 (kilburn) service at the University of Manchester. Some of these are exploiting novel and developing HPC techniques such as using Java in HPC and shared memory parallel programming using OpenMP. Such work may develop into future CSAR projects, particularly with the emphasis on shared memory in the 'Refresh' system. All efforts will be made to identify and develop new application areas for future Class 3 CSAR projects.

## **4 Training & Education Services**

A summer school will be run under the auspices of MRCCS, see Appendix 1.

We are working closely with Daresbury Laboratory staff on a Computational Chemistry workshop, planned for Autumn 99.

We are planning a seminar about MPI with a speaker from SGI USA.

## **5 User Registration and New User Services**

This section covers aspects relating to the registration of projects and users, and the management of project resources. It also includes a summary of the number of projects and users registered as at the end of the first quarter. Also relevant to this first quarter is the migration of archive data from other services, and a summary of this is included.

### **5.1 New Project Registration**

In this first quarter the majority of Class 1 projects registered on CSAR have been projects moving over from existing services at EPCC and RAL. 31 projects and the 3 HPCi Centres were given CSAR accounts and start-up allocations in November 1998. From January onwards the majority of the EPSRC projects were given full allocations for the remainder of their grants, based on completed CSAR application forms submitted to EPSRC. 10 NERC projects were given start-up allocations, and have recently been given 12 month allocations valid from 1<sup>st</sup> April 1999. In addition there have been 8 projects moving over from the J90 service at RAL (7 EPSRC, 1 NERC). These projects have not had a start-up allocation, but have been provided with an allocation for the remainder of their grant.

Take-up of the start-up accounts was mixed, with some projects still not having started using their CSAR accounts as at the end of the first quarter. The number of 'inactive' projects is currently 21, although it should be noted that this number includes most of the projects transferred from RAL services recently. Some of the inactive projects have registered but not subsequently used their CSAR accounts, whilst some have never requested their access passwords.

All projects with the exception of the HPCi Centres were allowed to keep any unused start-up allocations remaining when they received their main allocations. In a small number of cases, projects had a deficit of resources at the start of the year, and following consultation with EPSRC these deficits were written off so as to return projects to zero allocation at the start of 1999.

The CSAR frontline team have registered projects or given new allocations upon receipt of the information from EPSRC. This has generally been achieved within two working days. This has been an unusual period with regard to new project registration, due to most projects being existing projects moving from other services. Some of the transferred projects (those from RAL and all NERC projects) have not had to submit a CSAR application form, meaning that they are not familiar with the various CSAR resource types, and their project management tasks are consequently less straightforward. The provision of assistance by the Helpdesk in these cases is also more difficult due to the lack of resource requirement details.

The registration of entirely new projects for which we have seen and approved the application prior to peer review stage is more straightforward as we have more complete information. Also, we partially establish proposed projects within the database prior to approval (mainly for capacity planning purposes) and the subsequent conversion to a live project is very quick. One difficulty we have experienced with regard to new projects is that we have not received notification of approval by EPSRC Programme Managers without prompting.

Once projects are set up, PIs have then been contacted via email with information on their project, including access usernames and passwords for self-registration. Significant improvements have been made regarding the information provided at this stage, including the provision in early January of a web-based guide for project PIs giving full information on the tasks required to set up and manage their projects.

The Helpdesk personnel have provided assistance to PIs in setting up their project whenever requested, or seen to be appropriate. However, requests for performing tasks on behalf of PIs have been rare, with just two PIs requiring us to perform all tasks relating to web-based project management. One of these PIs has not yet elected to use this service and start using his two CSAR accounts. Many PIs have devolved project management tasks to another member of their group, and following some early teething problems all evidence suggests that CSAR PIs are able to cope ably with the web-based facilities. We are however continuing to monitor and improve this aspect of the service (see below).

## 5.2 The CSAR Registration System

The CSAR Registration System is the web-based system used for both project and user registration and all project management tasks. Although part of an existing Unix Registration system at Manchester Computing, there was additional functionality required for the CSAR Service. In the start-up phase of the service there were some teething problems experienced by project PIs, exacerbated by their lack of familiarity with the system. There have also been requests for additional functionality, the most major one being the implementation of sub-project resource management mechanisms. We have therefore undertaken a number of improvements and extensions during the start-up phase and the first quarter of 1999, the most significant of which are summarised below.

- Performance improvements - Some PIs have experienced considerable problems with the slow response times when performing project management tasks. To address these problems a new more powerful server was installed recently, and an obscure software bug was located and fixed. Feedback we have received suggest dramatic improvements have been achieved.
- Rationalisation of pages - We have implemented a number of improvements to the web interface resulting in a rationalisation of the pages and a decrease in the number of levels required before reaching specific project pages. A dedicated page for PIs has been provided giving a single point of access to all project management tasks, including the Trading Pool and the Capacity Planning pages, now closely linked to assist PIs in planning their trades.
- Sub-projects - A sub-project facility will be released imminently to enable larger groups to split their project into a number of sub-projects and thereby maintain greater control over resource usage at a group level. The implementation has been a non-trivial exercise, particularly because of the need to account correctly for historic resource usage for established users who are moved to sub-projects. Existing project PIs who wish to use the sub-project facility will be asked to provide the relevant information, and CSAR staff will then set up these projects and move users as necessary. Resource trading and capacity planning will take place at the main project level only, with actual resources being allocated to sub-projects by the

project PI. Sub-project PIs may be created to allow delegation of user level allocation tasks to sub-project level.

The Registration System will continue to evolve to address the wishes and requirements of the users and the service. For example, we are currently looking at the possibility of bulk resource allocation facilities.

### 5.3 Project and User Summary

As at the end of March 1999, there are 33 active Class 1 projects on the systems, along with 2 Class 2 projects and 3 HPCi Centre accounts. Two major new Class 1 projects have started, and two more have been approved and are imminent. One Class 3 project has been approved and has just started work. There are 21 inactive projects which are yet to start using their resources. There are currently around 250 registered Class 1/2/3 users, the bulk of these being users on projects transferred from other services. There are 6 Class 1 projects at application stage.

### 5.4 Data Migration from Other Services

The UGAMP consortium has been the major user of the CSAR tape archive system so far, with approximately 2.5 Tbytes of data having been transferred by tape from the RAL. Substantial effort has been provided by CfS to assist in this. The process, however, has not been without its difficulties, not least due to the large volumes and non-standard formats involved.

EPCC decided on a policy of user driven data transfer via FTP.

The OCCAM group at Southampton are reviewing their data storage requirements and may yet transfer a large amount of data to CSAR. Lessons learnt in the UGAMP data migration will be invaluable if this is the case.

## 6 Value-Added Services

### 6.1 Access to Enhanced HPC Facilities

A number of commercial users have already been brought onto the CSAR Service and discussions are ongoing with others. The usage is not yet at a level at which it can yield additional computational resources, but the commercial user requirements both today and projected are being fed into the Capacity Planning process.

Provisional capacity plans indicate a requirement for additional processing capability over the summer, 1999, to substantially increase the number of PE's.

CSC's Cray C94A system was made available as a Guest System from the start of the CSAR Service but was removed from service at the end of March '99 due to lack of interest. CSC's J90 and NERC's Fujitsu VPP300 systems remain available as Guest Systems for those requiring vector processing facilities.

### 6.2 Industrial Liaison Programme

- **Joint Projects** – SGL and UoM are working on a joint project to develop training in Unified Model for the UK Met. Office. We expect to run this course a total of five times in the next 12 months. This course is directly applicable to the UGAMP users of the CSAR Service and will be offered to them in Autumn 1999.
- **Databases** – Databases are covered below. SGI and CSC will publish these databases using their marketing infrastructure in the fullness of time.

- **Visiting Scientist Programme** – CfS, through SGI, is using the Royal Institute Bi-Centennial HPC event in May as a vehicle through which a number of important, eminent scientists will be available for consultation with CSAR Service users.

### **6.3 Research Liaison Programme**

We have hosted visitors from the Taiwan Representative Council, the Japan Atomic Energy Research Institute, and CSC Finland.

We will be hosting visitors from National Supercomputer Centre Sweden in May.

Relations with the High Performance Computing Centre (HLRS) at the University of Stuttgart are developing well in two areas: metacomputing and scientific visualization. We are working closely with them and their EU project partners to contribute and man a stand at Supercomputing 99.

### **6.4 New Applications Initiative**

Comparative studies of HPC applications on other major HPC facilities, primarily in the US have been initiated. Ways in which this initiative can be actively progressed are being sought.

A number of CfS meetings have been held concerning OpenGL Volumizer, a new API for volumetric visualisation targeted at very large 3D or 4D data sets. The project is to develop modules for AVS/Express which are multi-pipe capable. The modules will assist in the visualisation of very large scientific data sets ( into multiple Terabytes ) being produced in areas such as Medical, Climate modelling and Geosciences. This project will deliver a new capability for CSAR user applications, allowing non-graphics specialists to more efficiently post process large results files, so contributing to their scientific productivity.

### **6.5 Auxiliary Equipment**

Resources have been put in place to cater for the auxiliary equipment pool. A web page has been prepared, about what is being offered, and is out for comment within CfS. We expect to release the page before the end of April 1999.

### **6.6 Technology Access**

We will be progressing this over the next six months.

### **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 will be examining ways in which to carry this forward during 1999.

## **6.9 Access to Guest Systems**

The Fujitsu VPP has moved to Manchester, the CSC Cray J90 is also available and currently in use. The infrastructure for other Guest Systems is in place with information posted on the web site as and when new or additional systems become available.

Users can access resources on these systems in the same way as those of the core systems, by trading Generic Tokens through the Trading Pool.

## **6.10 ASCI Prototyping Capability**

Nothing to report as yet.

## **6.11 Manchester Research Centre for Computational Science (MRCCS)**

The recruitment of staff in the departments of Chemistry, Earth Sciences and Computer Science is underway.

A web page describing MRCCS (<http://www.man.ac.uk/mrccs>) is available. In addition to the three groups mentioned above we are working with 12 other groups at the University to promote their use of HPC.

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.

A preliminary announcement of the two-week summer school is available. We expect the full details to be finalised by the end of April. The Summer school is open to all. The fee for accommodation, food, and outings will be around £650 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.





**Manchester Research Centre for Computational Science**

## Preliminary Announcement

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

6<sup>th</sup> - 17<sup>th</sup> 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

# 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

<input type="checkbox"/> Systems & Architectures for Distributed Memory Programming	<input type="checkbox"/> Distributed Memory programming
<input type="checkbox"/> Parallel Algorithms for DMP	<input type="checkbox"/> MPI
<input type="checkbox"/> Tools for Profiling and Debugging	<input type="checkbox"/> Parallel Numerical Libraries for DM systems
<input type="checkbox"/> Systems & architectures for Visualization	<input type="checkbox"/> Computational Steering
<input type="checkbox"/> Visualization for Multidimensional & Scientific Data	<input type="checkbox"/> 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.