HECToR Quarterly Report

July - Sep 2010

1 Introduction

This report covers the period from 1 July 2010 at 0800 to 1 Sep 2010 at 0800.

Section 3 summarises service availability and performance statistics for this quarter. Utilisation statistics are also available in Section 3. A summary table of the key performance metrics is included. Section 4 shows Helpdesk statistics.

The Appendices define some of the terminology and incident severity levels and list the current HECToR projects together with their overall utilisation profile to date.

This report and the additional SAFE report are available to view online at http://www.hector.ac.uk/about-us/reports/quarterly/3Q10.php

2 Executive Summary

- XT utilisation in 3Q10 was 83.6%, compared to 75.3% in 2Q10. Further details are available in Section 3.2 of the report.

- Utilisation on the XT6 remains lower than we would like at 32.2% for the quarter. Although this percentage is low, more AUs were used on the XT6 than on the XT4 in 3Q10. The service now has far greater capacity and the challenge is to increase demand to meet this capacity.

- Charging rates on the XT6 have been reduced in order to provide some level of compensation for those users whose codes do not perform well on the current Seastar interconnect. These rates will be reviewed when the Gemini interconnect is installed. EPSRC are also reviewing allocation models.

- Low Priority Access accounted for 4.6% of the XT4 utilisation, and 46.7% of the XT6 utilisation in 3Q10. This initiative will remain in force until the arrival of Gemini.

- The service was far more reliable in 3Q10 than in the previous quarter. There were 7 service failures in 3Q10 as opposed to 16 in 2Q10. 6 failures were attributed to technology problems and there was one external security failure. The overall MTBF increased on 2Q10 from 137 to 366 hours.

- The performance metrics in 3Q10 were excellent. Reliability, Technology MTBF and the Capability Job Completion Rate all exceeded the full service level.

- The volume of single node failures has remained constant from the previous quarter.

- The helpdesk statistics were again excellent. No negative quality tokens were received from users in 3Q10 and a number of positive tokens were received.

- The X2 Vector system was very reliable in 3Q10. Charging remained suspended on the X2, resulting in an overall utilisation of 48.1%, compared to 39.9% in 2Q10. Further details on X2 utilisation are available in Section 3.2.5.

- The installation of the external lustre filesystem in 3Q10 did not go ahead as planned. A number of additional issues were encountered. The migration of user data to esFS has now been postponed until October 2010 pending the results of a 10-day dedicated testing and debugging period. Details are available in Section 5.1.1.

- The upgrade to the Gemini interconnect is now expected to take place in January 2011.

- A HECToR User Group meeting took place on October 12th. A number of options for HECToR Phase3 were presented.

3 Quantitative Metrics

3.1 Reliability

The metrics in Section 3.1 relate solely to the service machine – i.e. Phase 2a.

The monthly numbers of incidents and failures (SEV 1 incidents) are shown in the table below:

	Jul	***Aug***	***Sep***
Incidents	**17**	**25**	**26**
Failures	**3**	**2**	**2**

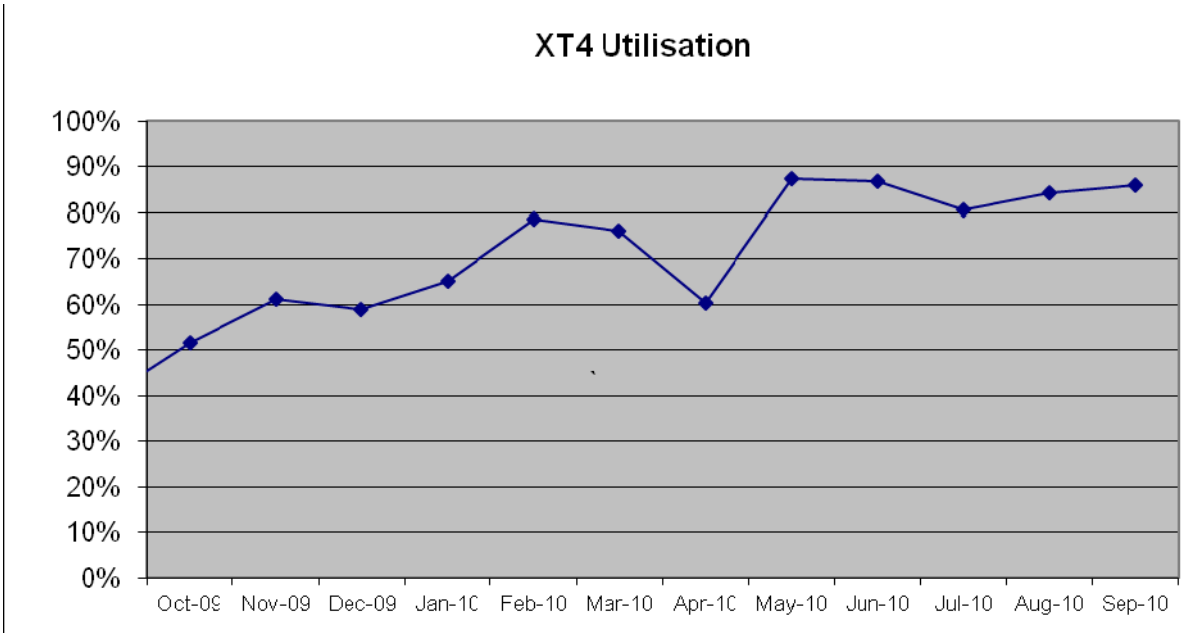
3.1.1 Performance Statistics

- MTBF = (732)/(number of failures in a month)
  Quarterly MTBF=(3x732)/(number of failures in a quarter)

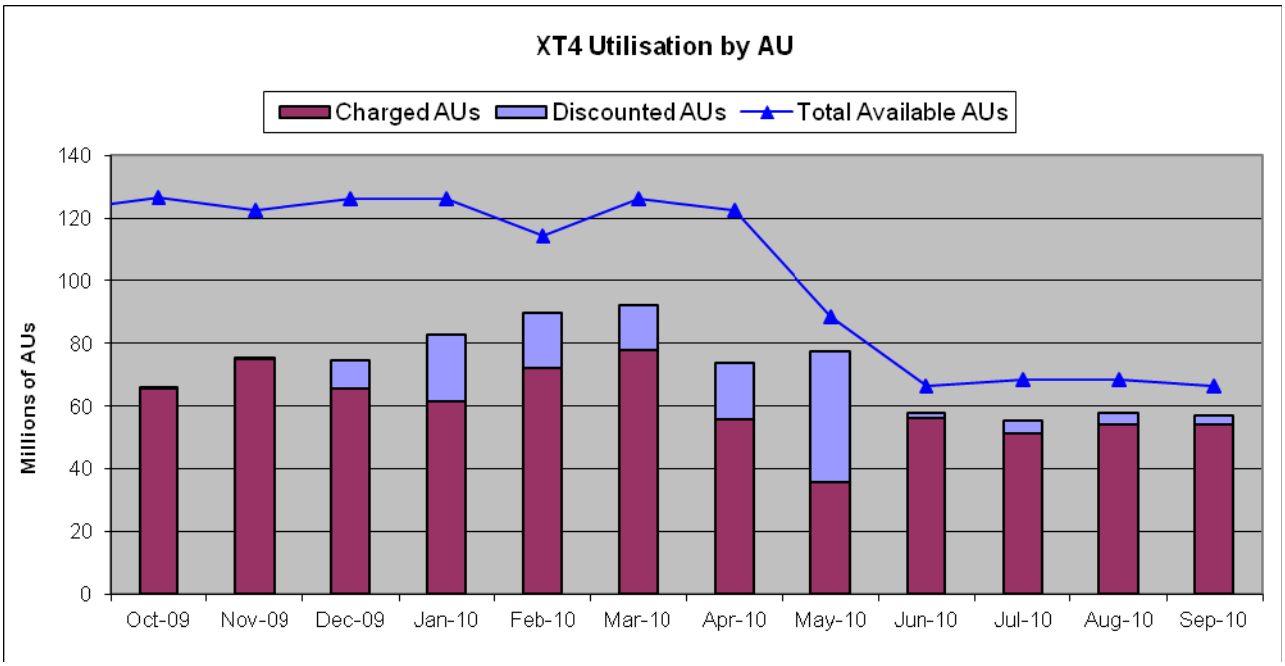
Attribution	***Metric***	***Jul***	***Aug***	***Sep***	***Quarterly***
Technology	Failures	3	2	1	6
	MTBF	244	366	732	366
Service Provision	Failures	0	0	0	0
	MTBF	∞	∞	∞	∞
External	Failures	0	0	1	1
	MTBF	∞	∞	732	2196
Overall	Failures	3	2	2	7
	MTBF	**244**	**366**	**366**	**314**

3.2 HECToR Utilisation

3.2.1 XT4 Utilisation



The XT4 utilisation quarterly average in 3Q10 was 83.6%, compared to 75% in 2Q10.

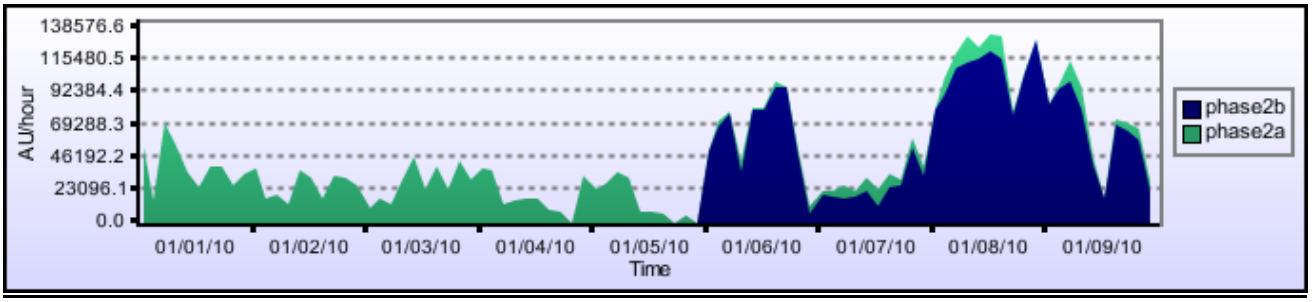


Capability Incentives

Capability incentive levels were reviewed in 3Q10 and the same discount rates now apply on both the Phase 2a And Phase 2b machines.

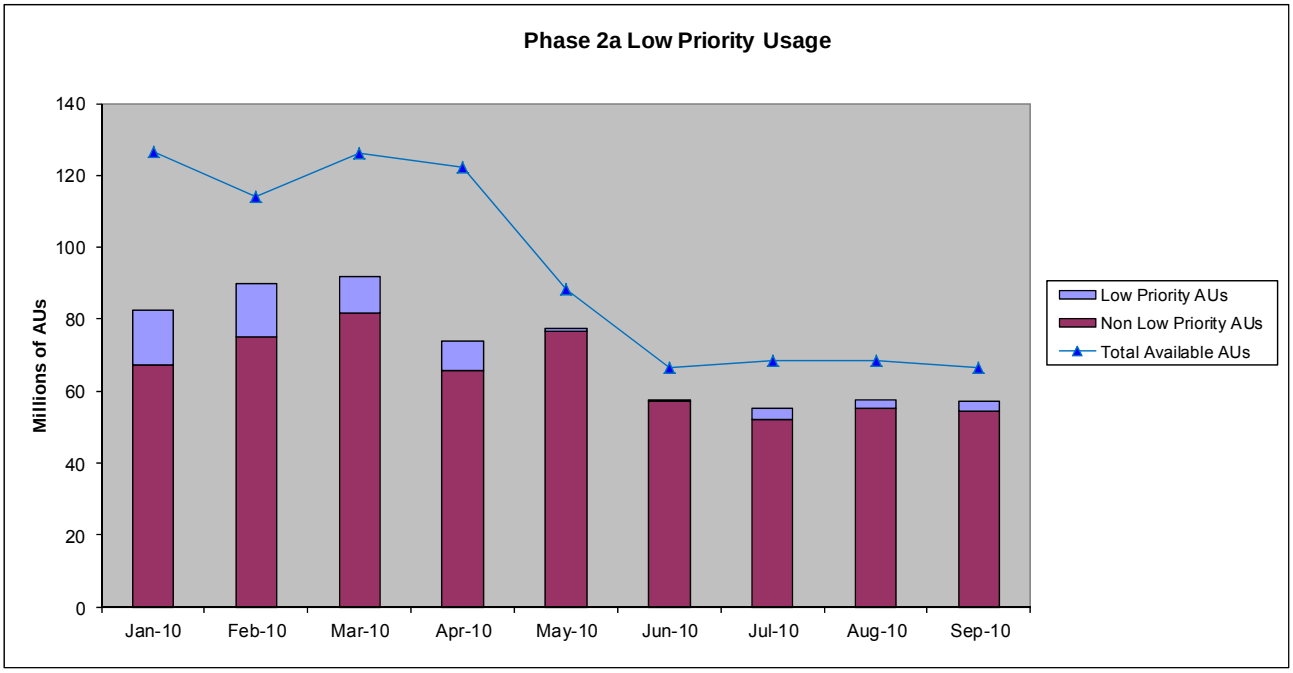
Level	***Minimum Number of Cores***	***Discount***
Bronze	2048	5%
Silver	4096	15%
Gold	8192	30%

As can be seen below, the introduction of the Phase 2b system has clearly increased the capability for running large jobs.

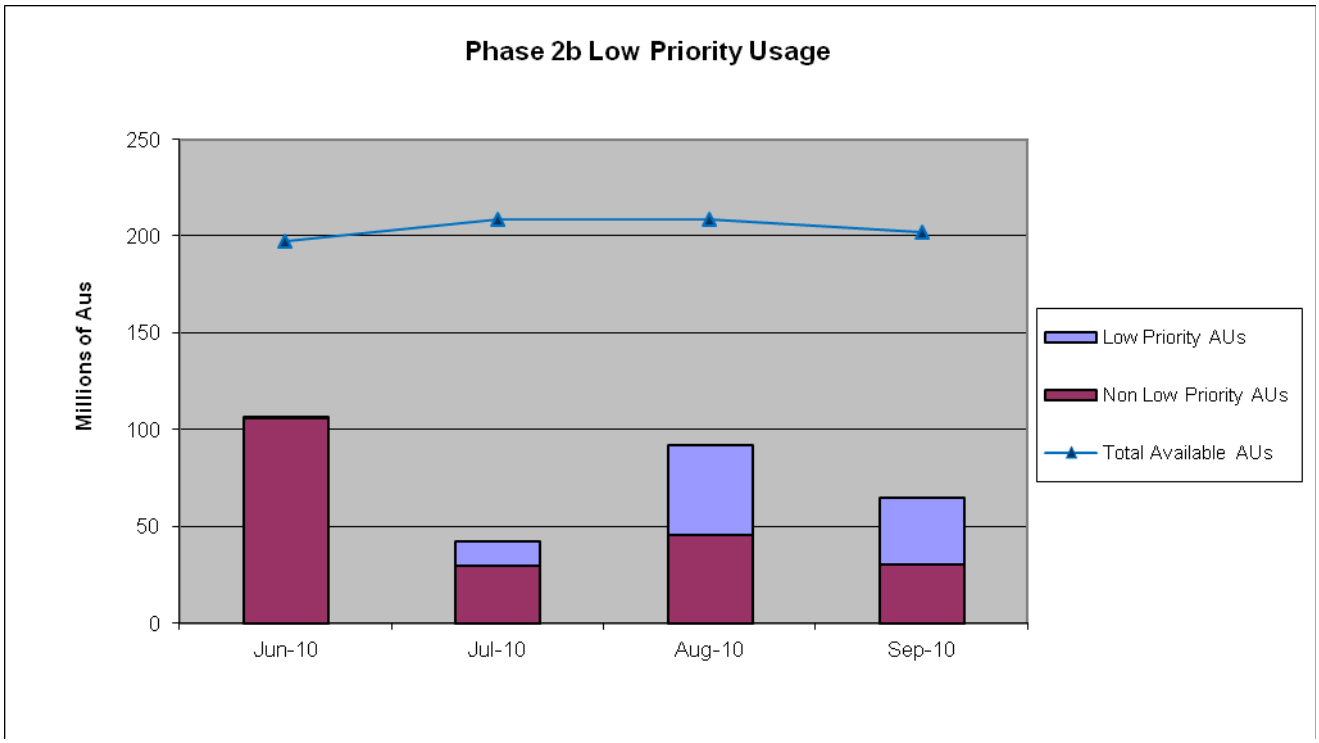


Low Priority Access

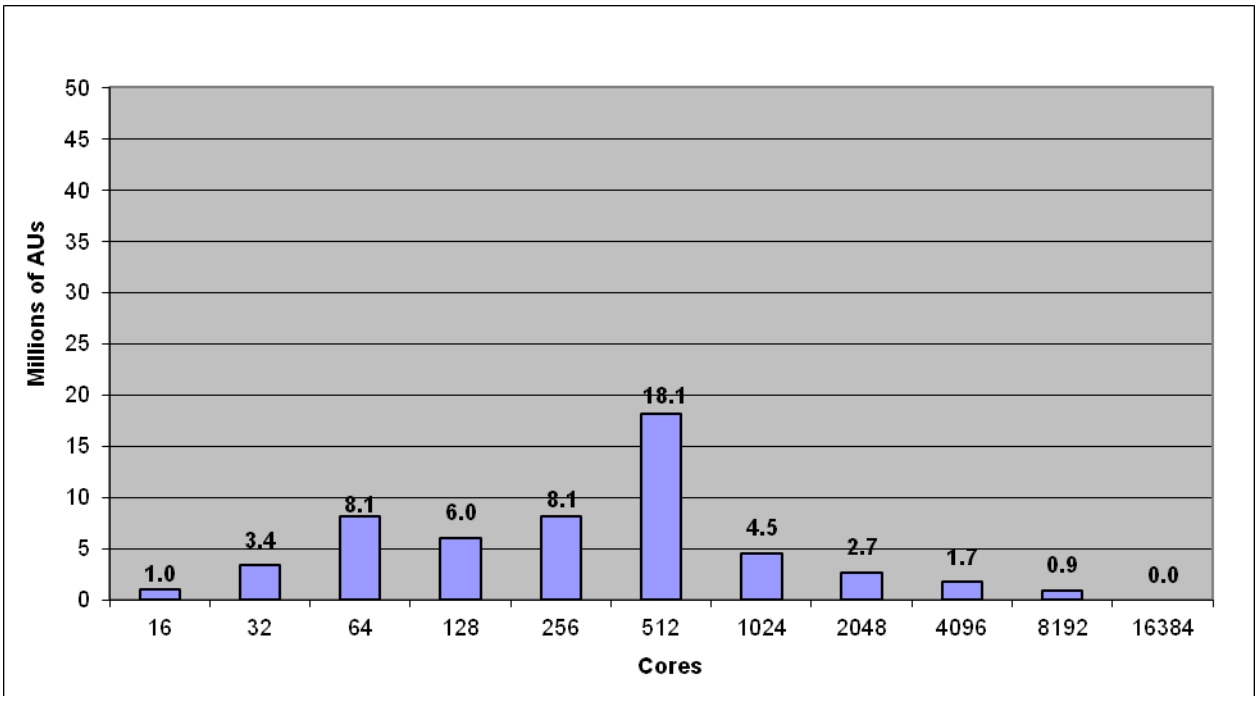
In 3Q10, low priority access accounted for 4.6% of the overall utilisation on the XT4. It continues to fill the available gaps.



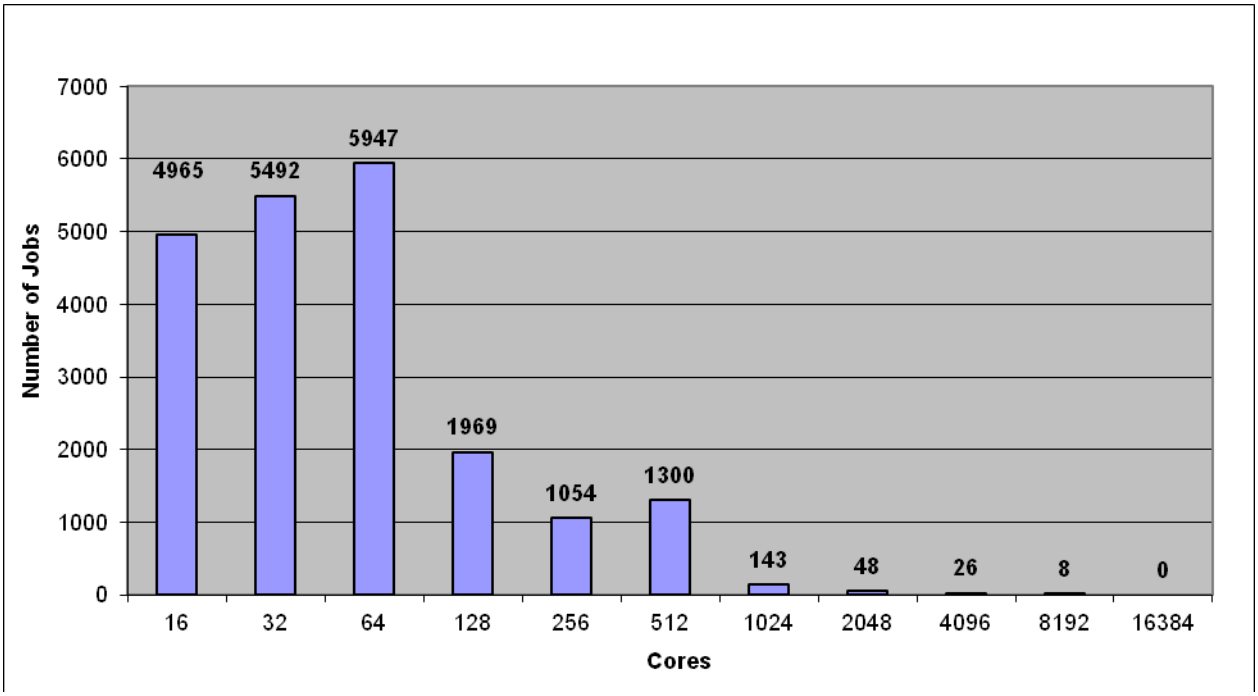
In 3Q10, low priority access accounted for 46.7% of the overall utilisation on the XT6.



3.2.2 XT4 Utilisation by Core Count

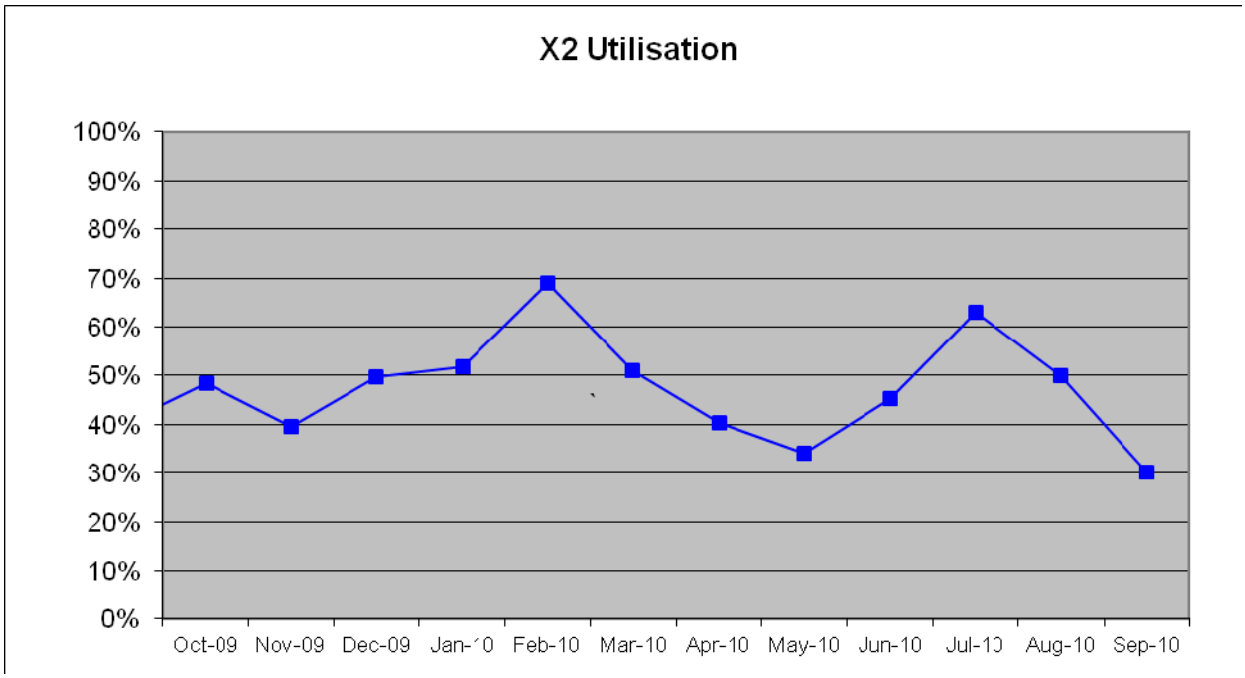


3.2.3 XT4 Number of jobs by Core Count



3.2.5 X2 Utilisation

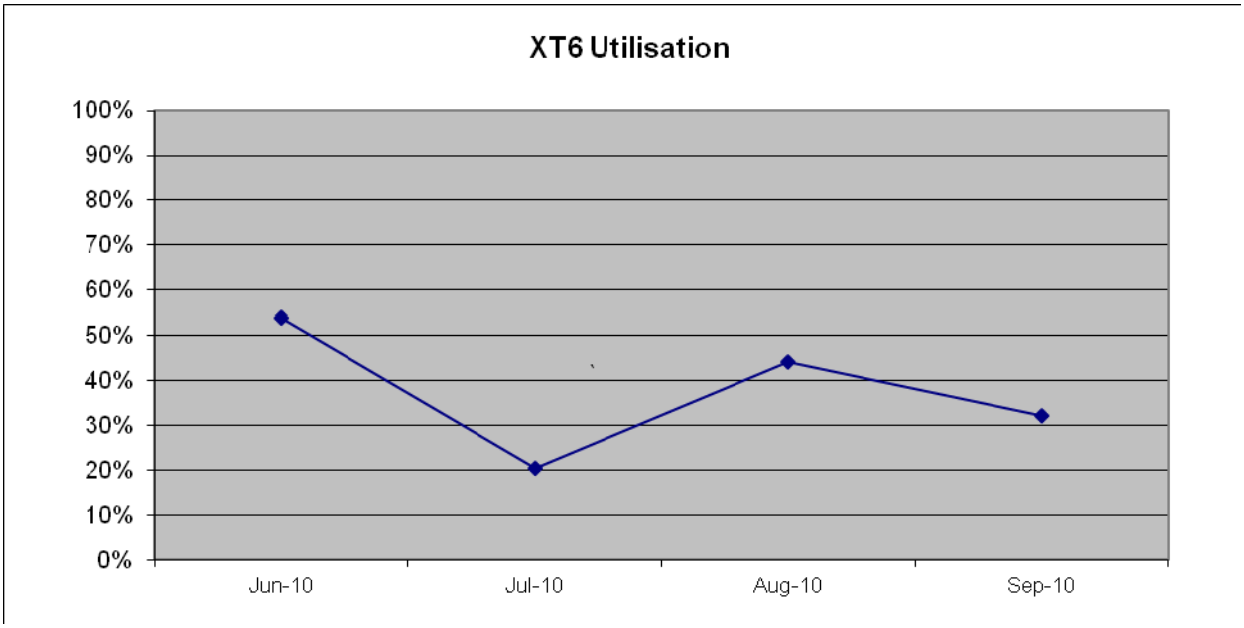
Accounting remained suspended on the X2 throughout 3Q10.



The overall X2 utilisation for 3Q10 was 48.1%. We have contacted all of the key users of the X2 to understand what their requirement would be for maintaining the X2 capability beyond Phase 2 of the service. The feedback will be collated and passed to the research councils.

3.2.6 XT6 Utilisation

Utilisation on the XT6 remains lower than we would like.



Charging was initially suspended during the availability trial phase of the upgrade. The trial completed successfully on 24th June, and charging was enabled on 28th June. The Linpack based AU rate was initially discounted by an agreed 20% in order to allow for any performance impact whilst we await the Gemini interconnect. This discount was later reviewed and was increased to 40% as of 29th September.

Despite the low utilisation percentage figure, it is worth noting that in 3Q10 more AUs were used on the XT6 than on the XT4. There is now a far greater capacity on the service. The challenge is to grow the use of the service to match the increased capacity.

3.2.4 Utilisation by Consortium

Project	XT4 Utilisation	XT6 Utilisation	X2 Utilisation
y01	0.0%	0.0%	0.0%
y02	0.0%	0.3%	0.0%
y03	0.0%	0.0%	0.0%
y04	0.0%	0.0%	0.0%
y05	0.0%	0.0%	0.0%
y06	0.0%	0.0%	0.0%
y07	0.0%	0.0%	0.0%
z01	0.1%	0.0%	0.0%
z02	0.0%	0.0%	0.0%
z03	0.0%	0.2%	0.0%
z06	0.0%	0.0%	0.0%
Internal Total	**0.1%**	**0.5%**	**0.0%**
c01	1.6%	0.2%	0.0%
e01	3.6%	7.2%	45.1%
e05	7.0%	1.5%	2.6%
e10	0.1%	0.0%	0.0%
e24	10.8%	2.9%	0.0%
e35	0.0%	0.0%	0.0%
e42	0.0%	0.0%	0.0%
e59	0.0%	0.0%	0.0%
e63	1.3%	0.1%	0.0%
e68	0.9%	0.3%	0.0%
e71	0.6%	0.0%	0.0%
e75	0.0%	0.0%	0.0%
e76	1.3%	0.0%	0.0%
e81	0.0%	0.0%	0.0%
e82	0.0%	0.0%	0.0%
e84	0.1%	0.0%	0.0%
e85	0.0%	0.5%	0.0%
e89	6.7%	7.3%	0.0%
e92	0.0%	0.1%	0.0%
e102	0.1%	0.0%	0.0%
e104	0.2%	0.0%	0.0%
e107	0.0%	0.0%	0.0%
e110	1.4%	1.0%	0.0%
e113	0.0%	0.0%	0.0%
e117	3.7%	0.0%	0.0%
e120	0.0%	0.0%	0.0%
e121	2.2%	0.0%	0.0%
e122	1.3%	0.1%	0.0%
e124	0.0%	0.6%	0.0%
e125	0.7%	1.2%	0.0%
e126	0.5%	0.0%	0.0%
e127	0.0%	0.0%	0.0%
e129	0.1%	0.0%	0.0%
e131	0.0%	0.0%	0.0%
e132	0.0%	0.0%	0.0%
e136	1.3%	0.0%	0.0%
e137	0.0%	0.0%	0.0%
e138	0.0%	0.0%	0.0%

Project	XT4 Utilisation	XT6 Utilisation	X2 Utilisation
e139	0.0%	0.0%	0.0%
e141	0.0%	0.4%	0.0%
e144	0.0%	0.0%	0.0%
e145	0.0%	0.0%	0.0%
e147	0.0%	0.0%	0.0%
e148	0.0%	0.0%	0.0%
e149	1.0%	0.0%	0.0%
e150	0.2%	0.0%	0.0%
e151	0.3%	0.1%	0.0%
e152	0.1%	2.3%	0.0%
e153	0.0%	0.0%	0.0%
e154	1.0%	0.0%	0.0%
e156	0.0%	0.0%	0.0%
e157	0.0%	0.0%	0.0%
e162	0.0%	0.0%	0.0%
e163	0.2%	0.0%	0.0%
e167	0.0%	0.0%	0.0%
e169	0.0%	0.0%	0.0%
e171	0.3%	0.0%	0.0%
e172	0.2%	0.0%	0.0%
e173	0.0%	0.0%	0.0%
e174	0.2%	0.0%	0.0%
EPSRC Total	**49.4%**	**26.1%**	**47.7%**
e178	0.0%	0.0%	0.0%
n01	4.4%	1.5%	0.0%
n02	17.9%	1.7%	0.0%
n03	9.0%	0.7%	0.0%
n04	1.6%	1.0%	0.0%
NERC Total	**32.9%**	**4.9%**	**0.0%**
b09	0.0%	0.2%	0.0%
b10	0.0%	0.0%	0.0%
b100	0.1%	0.0%	0.0%
BBSRC Total	**0.1%**	**0.3%**	**0.0%**
p01	0.0%	0.0%	0.0%
STFC Total	**0.0%**	**0.0%**	**0.0%**
e168	0.0%	0.0%	0.0%
t01	0.6%	0.0%	0.0%
x01	0.3%	0.2%	0.0%
x05	0.1%	0.0%	0.0%
x06	0.0%	0.0%	0.0%
External Total	**1.0%**	**0.2%**	**0.0%**
d03	0.0%	0.0%	0.0%
d04	0.0%	0.0%	0.0%
d11	0.0%	0.0%	0.0%
d14	0.0%	0.1%	0.0%
d16	0.0%	0.0%	0.0%
d17	0.0%	0.0%	0.3%
d18	0.0%	0.0%	0.0%
d19	0.0%	0.0%	0.0%
d22	0.0%	0.0%	0.0%
d23	0.0%	0.0%	0.0%
Directors Time Total	**0.0%**	**0.2%**	**0.3%**
Overall Total	**83.6%**	**32.2%**	**48.1%**

3.3. Performance Metrics

All performance metrics relate solely to the service machine – i.e. Phase 2a.

Metric	TSL(%)	FSL(%)	Jul-10	Aug-10	Sep-10	3Q10
Technology reliability (%)	85.00%	98.50%	99.3%	98.6%	99.9%	99.2%
Technology MTBF (hours)	100	126.4	244.0	366.0	366.0	366.0
Technology Throughput, hours/year	7000	8367	8601	8348	8307	8418
Capability jobs completion rate	70%	90%	97.7%	98.2%	96.7%	97.2%
Non in-depth queries resolved within 1 day (%)	85%	97%	100.0%	99.0%	97.7%	98.9%
Number of SP FTEs	7.3	8.0	9.0	9.0	9.1	9.0
SP Serviceability (%)	80.00%	99.00%	100.0%	100.0%	100.0%	100.0%

Colour coding:

Exceeds FSL	
Between TSL and FSL	
Below TSL	

The performance metrics in 3Q10 were excellent. Reliability, Technology MTBF and the Capability Job Completion Rate all exceeded the full service level.

4. Helpdesk

A total of 902 queries with a specified service metric were completed in this period.

Helpdesk Targets

Metric	Pass	Total	Fraction	Target
All queries finished in 1 day	739	746	99.1%	97.0%
Admin queries finished in 1 day	668	674	99.1%	97.0%
Queries assigned in 30 min	891	891	100.0%	97.0%
Technical assessments in 10 days	35	35	100%	97.0%

Queries by Service Metric

Service Metric	Queries	Percentage
Automatic	474	52.55%
Admin	200	22.17%
In-depth	121	13.41%
Technical	72	7.98%
Technical assessment class-1	28	3.10%
Technical assessment class-2	7	0.78%

Queries by Category

Query Category	Queries	Percentage
New User	125	13.90%
Set group quotas	100	11.10%
New Password	81	9.00%
None	66	7.30%
3rd Party Software	65	7.20%
Access to HECToR	62	6.90%
User behaviour	47	5.20%
Set user quotas	44	4.90%
Disk, tapes, resources	42	4.70%
Add to group	36	4.00%
Batch system and queues	26	2.90%
New Group	24	2.70%
Join Project	23	2.50%
Compilers and system software	23	2.50%
Node Failure	20	2.20%
User programs	19	2.10%
Login, passwords and ssh	14	1.60%
Update account	13	1.40%
Other	13	1.40%
Remove account	11	1.20%
SAFE	10	1.10%
Delete from group	10	1.10%
Archive	9	1.00%

Courses	6	0.70%
Static website	3	0.30%
Delete from project	3	0.30%
Create certificate	3	0.30%
Performance and scaling	2	0.20%
Porting	1	0.10%
Network	1	0.10%

Queries by Handler Category

Handlers	Total	Automatic	Technical Assessment	Admin	Technical	In-depth	%age
OSG	517	473		15	24	5	57.32%
CSE	91		35		1	55	10.09%
USL	261	1		185	37	38	28.94%
Cray	33				10	23	3.66%

4. 1 Quality Tokens

A number of positive quality tokens were set by users during 3Q10. No negative tokens were received.

Project	*Negative Tokens*	*Positive Tokens*
e125	0	5
e89	0	5
Total	**0**	**10**

5 System Hardware

5.1 HECToR Technology Changes

5.1.1 esFS Upgrade

The migration to external lustre (esFS) was originally planned for 2Q10. Due to the major issues encountered in April, this was then delayed until 3Q10. Further issues with the upgrade were then encountered in July and August and the planned migration of user data was postponed for a second time. The decision was taken in late September to remove the Phase 2a system from user service in October for a period of 10-days to enable dedicated testing and debugging to take place. The migration of user data will commence thereafter.

5.1.2 CLE3.1 Upgrade

The operating system on the Phase 2b service was upgraded on 29th September. All core third party applications, including the Unified Model were tested prior to the upgrade, and no major issues were encountered.

5.1.3 Gemini Upgrade

The upgrade to the Gemini interconnect has been delayed until the migration to esFS is complete. This is now expected to take place in January 2011.

5.2 Severity-1 Incidents

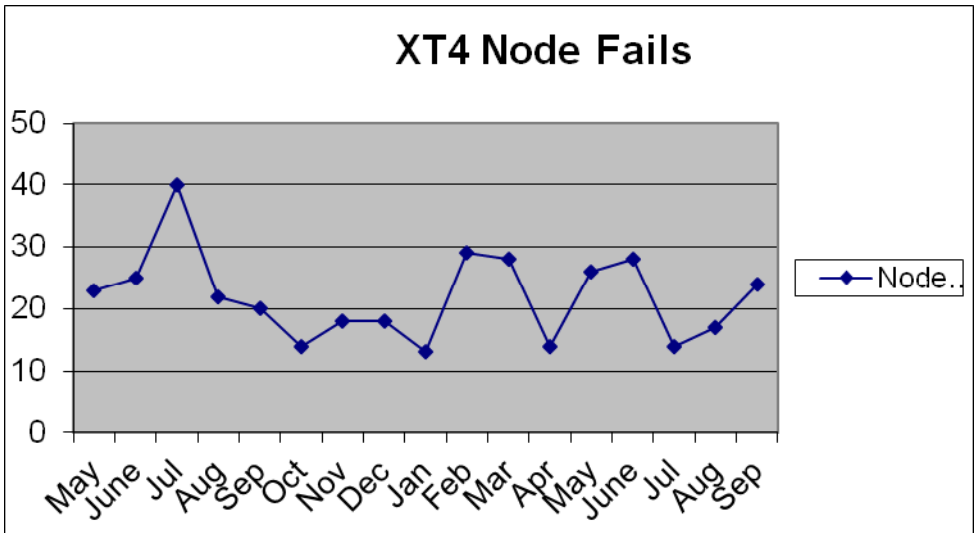
The monthly numbers of incidents and failures (SEV 1 incidents) are shown in the table below:

	Jul	***Aug***	***Sep***
Incidents	**17**	**25**	**26**
Failures	**3**	**2**	**2**

Technology failures were responsible for 6 of the Severity-1 incidents during 3Q10. Of the 6 technology failures, there was no particular trend. There was one process failure among them, and the other 5 failures were distinct hardware faults. In addition, there was one external security alert. There were no service provision failures in 3Q10.

5.3 Single Node Failures

Node failure rates as a result of DIMM failures and Opteron Cache failures remain very low. Most node failures on the XT4 relate to communications errors



On the XT6 system, node failure rates are also low. The majority of errors relate to an 'Out of Memory' software condition. This is an issue which is fixed in CLE3.1 and which was installed on the XT6 on 29th September.

Appendix A: Terminology

TSL : Threshold Service Level

FSL : Full Service Level

SDT : Scheduled Down Time

UDT : Unscheduled Down Time

WCT : Wall Clock Time

MTBF : Mean Time Between Failures = 732/Number of Failures

SP : Service Provision

SP Serviceability% = 100*(WCT-SDT-UDT(SP))/(WCT-SDT)

Technology Reliability % = 100*(1-(UDT(Technology)/(WCT-SDT))

Incident Severity Levels

SEV 1 — anything that comprises a FAILURE as defined in the contract with EPSRC.

SEV 2 — NON-FATAL incidents that typically cause immediate termination of a user application, but not the entire user service.

The service may be so degraded (or liable to collapse completely) that a controlled, but unplanned (and often very short-notice) shutdown is required or unplanned downtime subsequent to the next planned reload is necessary.

This category includes unrecovered disc errors where damage to file systems may occur if the service was allowed to continue in operation; incidents when although the service can continue in operation in a degraded state until the next reload, downtime at less than 24 hours notice is required to fix or investigate the problem; and incidents whereby the throughput of user work is affected (typically by the unrecovered disabling of a portion of the system) even though no subsequent unplanned downtime results.

SEV 3 — NON-FATAL incidents that typically cause immediate termination of a user application, but the service is able to continue in operation until the next planned reload or re-configuration.

SEV 4 — NON-FATAL recoverable incidents that typically include the loss of a storage device, or a peripheral component, but the service is able to continue in operation largely unaffected, and typically the component may be replaced without any future loss of service.

Appendix B: Projects on HECToR

Code	Title	Funding Body	Class	PI	Total AUs allocated	AUs used	AUs left
EPSRC Projects							
e01	UK Turbulence Consortium	EPSRC	Class1a	Dr Gary N Coleman	483,969,876	26,143,639	457,826,237
e05	Materials Chemistry HPC Consortium	EPSRC	Class1a	Prof C Richard A Catlow	1,139,124,000	100,979,241	1,038,084,759
e10	GENIUS	EPSRC	Class1a	Prof Peter Coveney	10,248,188	6,572,530	3,675,658
e101	Optimization of HPCx LES code	EPSRC	Class2a	Prof Michael Leschziner	641,009	642,368	-1,359
e104	Fluid-Mechanical Models applied to Heart Failure	EPSRC	Class1a	Dr Nicolas Smiths	30,400,000	852,477	29,547,523
e105	Joint Euler/Lagrange Method for Multi-Scale Problems	EPSRC	Class1a	Dr Andreas M Kempf	1,300,000	297,323	1,002,677
e106	Numerical Simulation of Multiphase Flow: From Mesocales to	EPSRC	Class1a	Prof Kai Luo	3,650,000	0	3,650,000
e107	Parallel Brain Surgery Simulation	EPSRC	Class1a	Dr Stephane P. A. Bordas	6,000,000	332,482	5,667,518
e108	Unsteady Propeller Noise	EPSRC	Class2b	Dr Sergey Karabasov	673,164	158,100	515,064
e110	Computational Aeroacoustics Consortium	EPSRC	Class1a	Prof Paul Tucker	39,100,000	25,440,934	13,659,066
e117	Binding free energy estimations	EPSRC	Class1b	Dr Carmen Domene	12,247,664	12,289,068	-41,404
e122	Multiscale Modelling of Magnetised Plasma Turbulence	EPSRC	Class1a	Dr Colin M Roach	65,000,000	18,539,258	46,460,742
e124	Compressible Axisymmetric Flows	EPSRC	Class1a	Dr Richard D Sandberg	22,887,943	5,885,963	17,001,980
e125	Full configuration interaction quantum monte carlo	EPSRC	Class1a	Dr Ali Alavi	18,324,825	3,572,645	14,752,180
e126	Clean Coal Combustion: Burning Issues of Syngas Burning	EPSRC	Class1a	Prof Xi Jiang	9,984,000	4,213,941	5,770,059

Code	Title	Funding Body	Class	PI	Total AUs allocated	AUs used	AUs left
e127	Alternative drag-reduction strategies	EPSRC	Class1a	Prof Michael Leschziner	7,000,000	2,852	6,997,148
e128	Rate-Controlled Constrained Equilibrium	EPSRC	Class1a	Dr Stelios Rigopoulos	6,230,000	0	6,230,000
e129	Novel Hybrid LES-RANS schemes [ICL]	EPSRC	Class1a	Prof Michael Leschziner	7,500,000	263,821	7,236,179
e130	Novel hybrid LES-RANS schemes [MAN]	EPSRC	Class1a	Prof Dominique Laurence	10,500,000	0	10,500,000
e131	Direct Simulation of a Pure Plume impinging on a density surface	EPSRC	Class2a	Dr Maarten van Reeuwijk	265,000	76,896	188,104
e133	Implementation of Established Algorithms to Extend HELIUM	EPSRC	Class2b	Prof Ken Taylor	800,000	0	800,000
e134	Numerical Simulation of Turbomachinery Flows	EPSRC	Class2a	Dr Francesco Montomoli	291,790	16,419	275,371
e136	Modelling the UK Wind Power Resource	EPSRC	Class1b	Dr Gareth Harrison	5,679,268	3,503,388	2,175,880
e137	Turbulent Pipe Flow	EPSRC	Class2a	Prof Dwight Barkley	200,000	205,320	-5,320
e141	A numerical study of turbulent manoeuvering-body wakes	EPSRC	Class1a	Dr Gary N Coleman	16,350,000	144,332	16,205,668
e144	Numerical Simulation of Rotating Stall and Surge	EPSRC	Class1a	Dr Mehdi Vahdati	1,266,001	24	1,265,977
e145	UK-SHEC Consortium	EPSRC	Class1a	Dr T.J. Mays	1,191,899	182,408	1,009,491
e147	Scale adaptive simulations of turbulent flows	EPSRC	Class2a	Prof Oubay Hassan	243,495	130,309	113,186
e148	Adding the molecular dynamics functionality to the quantum	EPSRC	Class2b	Prof Dario Alfe`	638,951	263,691	375,260
e149	Fractal-generated turbulence and mixing: flow physics and	EPSRC	Class1a	Prof Christos Vassilicos	51,920,000	2,620,215	49,299,785
e155	Modelling Cholesterol Deposits	EPSRC	Class1a	Dr David Quigley	10,000,000	0	10,000,000
e156	Metal Conquest: efficient simulation of metals on petaflop	EPSRC	Class2b	Dr David Bowler	800,000	212	799,788
e157	Global stability computations of separated flows	EPSRC	Class2a	Prof Jitesh S B Gajjar	299,996	98	299,898

Code	Title	Funding Body	Class	PI	Total AUs allocated	AUs used	AUs left
e158	Novel Asynchronous Algorithms	EPSRC	Class1a	Prof Nicholas J Higham	500,000	0	500,000
e159	Multi-layered Abstractions for PDEs	EPSRC	Class1a	Prof Paul Kelly	3,816,000	0	3,816,000
e160	Sustainable Software Generation Tools	EPSRC	Class1a	Prof Paul Kelly	20,208,060	0	20,208,060
e161	Properties and Dynamics of Atomic Bose-Einstein Condensates	EPSRC	Class1a	Dr A White	69,895,466	0	69,895,466
e165	Multi-scale simulation of intense laser plasma interactions	EPSRC	Class1a	Dr Tony Arber	4,872,000	0	4,872,000
e166	Large Eddy Simulation of LNG Pool Fires	EPSRC	Class2a	Dr Siaka Dembele	300,000	82,964	217,036
e167	LES of supersonic jets	EPSRC	Class1b	Prof William Dawes	2,696,000	155,781	2,540,219
e171	Conformational switching of tetra-(bromophenyl) porphyrins	EPSRC	Class1b	Prof Mats Persson	1,704,960	1,734,321	-29,361
e173	Performance of oomph-lib in largescale parallel computations	EPSRC	Class2a	Prof Matthias Heil	300,000	44,139	255,861
e174	3D instabilities in two-layer flows	EPSRC	Class2a	Dr Prashant Valluri	701,899	401,899	300,000
e176	Structure refinement of nanomaterials	EPSRC	Class2a	Prof. Peter G Bruce	300,000	0	300,000
e177	Amorphous structures of mirror coatings	EPSRC	Class2a	Dr Ian Maclaren	300,000	0	300,000
e19	Edinburgh Soft Matter and Statistical Physics Group	EPSRC	Class1a	Prof Michael Cates	4,663	6,171	-1,508
e24	DEISA	EPSRC	Class1a	Mrs Alison Kennedy	233,146,943	115,245,818	117,901,125
e63	UK Applied Aerodynamics Consortium 2	EPSRC	Class1a	Dr Nick Hills	30,925,323	20,468,761	10,456,562
e68	Hydrogenation Reactions at Metal Surfaces	EPSRC	Class1a	Prof. Angelos Michaelides	50,000,000	41,243,007	8,756,993
e71	Simulating the control of calcite crystallisation	EPSRC	Class1a	Prof John Harding	130,403,522	41,413,263	88,990,259
e76	HELIUM Developments	EPSRC	Class1a	Prof Ken Taylor	42,521,798	33,211,189	9,310,609

Code	Title	Funding Body	Class	PI	Total AUs allocated	AUs used	AUs left
e77	Porting of DFT/GW Codes	EPSRC	Class2a	Prof Maria Merlyne DeSouza	209,662	60,676	148,986
e82	ONETEP: linear-scaling method on High Performance Computers	EPSRC	Class1b	Dr Peter Haynes	1,105,352	396,427	708,925
e84	Vortical Mode Interactions	EPSRC	Class1a	Dr Tamer Zaki	9,600,000	503,811	9,096,189
e85	Study of Interacting Turbulent Flames	EPSRC	Class1a	Dr N Swaminathan	8,088,610	2,122,695	5,965,915
e89	Support for UK Car-Parrinello Consortium	EPSRC	Class1a	Dr Matt Probert	360,000,001	149,818,264	210,181,737
e92	Dynamo Action In Compressible Convection	EPSRC	Class1a	Mr Paul Bushby	4,075,000	896,690	3,178,310
y08	Testing	EPSRC	Early use	Dr David Jenkins	1,000	0	1,000
NERC Projects							
n04	Shelf Seas Consortium	NERC	Class1a	Dr Roger Proctor	88,202,935	59,566,591	28,636,344
n01	Global Ocean Modelling Consortium	NERC	Class1a	Dr Thomas Anderson	89,243,840	49,172,203	40,071,637
n02	NCAS (National Centre for Atmospheric Science)	NERC	Class1a	Dr Lois Steenman-Clark	258,768,327	190,628,387	68,139,940
n03	Computational Mineral Physics Consortium	NERC	Class1a	Prof John P Brodholt	284,142,416	206,515,914	77,626,502
u01	Melting of MgSiO3 Perovskite	NERC	Early use	Prof John P Brodholt	11,000,000	11,018,423	-18,423
BBSRC Projects							
b08	Int BioSim	BBSRC	Class1a	Mr Mark M Sansom	866,000	909,998	-43,998
b100	Widening the BBSRC HPC User Base	BBSRC	Class1a	Dr Michael Ball	10,000,000	632,465	9,367,535
External Projects							
x01	HPC-Europa	External	Class1a	Dr Judy Hardy	16,415,790	6,916,413	9,499,377

Code	Title	Funding Body	Class	PI	Total AUs allocated	AUs used	AUs left
e168	TEXT	External	Service	Dr Mark Bull	1,500,000	0	1,500,000
x05	FIOS	External	Class1a	Mr Davy Virdee	1,130,100	1,074,930	55,170
t01	NIMES: New Improved Muds from Environmental Sources.	External	Class1a	Dr Chris Greenwell	4,113,669	4,245,424	-131,755
Director's Time Projects							
d03	EUFORIA	DirectorsTime	Service	Mr Adrian Jackson	2,200,000	1,587,951	612,049
d04	MSc in HPC	DirectorsTime	Service	Dr David Henty	343,500	204,567	138,933
d15	HPC-GAP	DirectorsTime	Service	Dr David Henty	2,033	1,037	996
d16	ETC	DirectorsTime	Service	Dr Lorna Smith	501,000	133,964	367,036
d18	FireGrid HPC	DirectorsTime	Service	Prof Arthur S Trew	600,001	250,303	349,698
d19	OpenFOAM Demo	DirectorsTime	Service	Dr Alan Gray	950,000	396,957	553,043
d20	CSCS	DirectorsTime	Service	Dr Alan Gray	50,000	0	50,000
d21	GADGET	DirectorsTime	Service	Dr Adrian Jenkins	1,000,001	18,584	981,417
d23	TEXT FP7	DirectorsTime	Service	Dr Mark Bull	1,500,000	9,625	1,490,375
d24	SBSI	DirectorsTime	Service	Dr Stephen Gilmore	2,000,000	106,359	1,893,641
y09	Director's Time	DirectorsTime	Service	Prof Arthur S Trew	29,685,133	82,538	764,170