HECToR Quarterly Report

April – June 2011

1 Introduction

This report covers the period from 1 April 2011 at 0800 to 1 July 2011 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/2Q11.php

2 Executive Summary

- The Phase 2a systems (both XT4 and X2) were decommissioned at the end of May 2011.

- Utilisation on the XE6 averaged 70% for the quarter. During April/May, the utilization of both the XT4 and X2 systems was around 40%. Further details are available in Section 3 of the report.

- Reliability was as good as the previous quarter with only 5 failures, and an overall MTBF of 439 hours. Of the five failures, two of them were as a result of hardware faults on the filesystem. There was one maintenance over-run, a power failure due to an external fault, and a site failure.

- The helpdesk statistics were again excellent. 14 positive quality tokens were received from users in 2Q11, with no negative tokens received.

- The HECToR GPGPU test-bed completed acceptance tests in March. Users from two EPSRC consortia, one NERC consortium and local Edinburgh users now have access to the facility.

- Work commenced in June to migrate all non-NERC data to a secondary external Lustre filesystem. This work completed as planned on 10th July.

- Plans for Phase 3 remain on track. There have been no changes to the plans, and the system is expected to be accepted in an October/November timeline.

- An initial meeting with users to review a proposal for a HECToR tertiary storage system was held on 15th July at the Institute of Physics in London. Key HECToR user groups contributed their initial feedback on what users would want from such a storage system. EPSRC will now use this initial feedback to form an initial baseline of user requirements.

3 Quantitative Metrics

3.1 Reliability

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

	Apr	May	June
Incidents	29	42	15
Failures	2	2	1

3.1.1 Performance Statistics

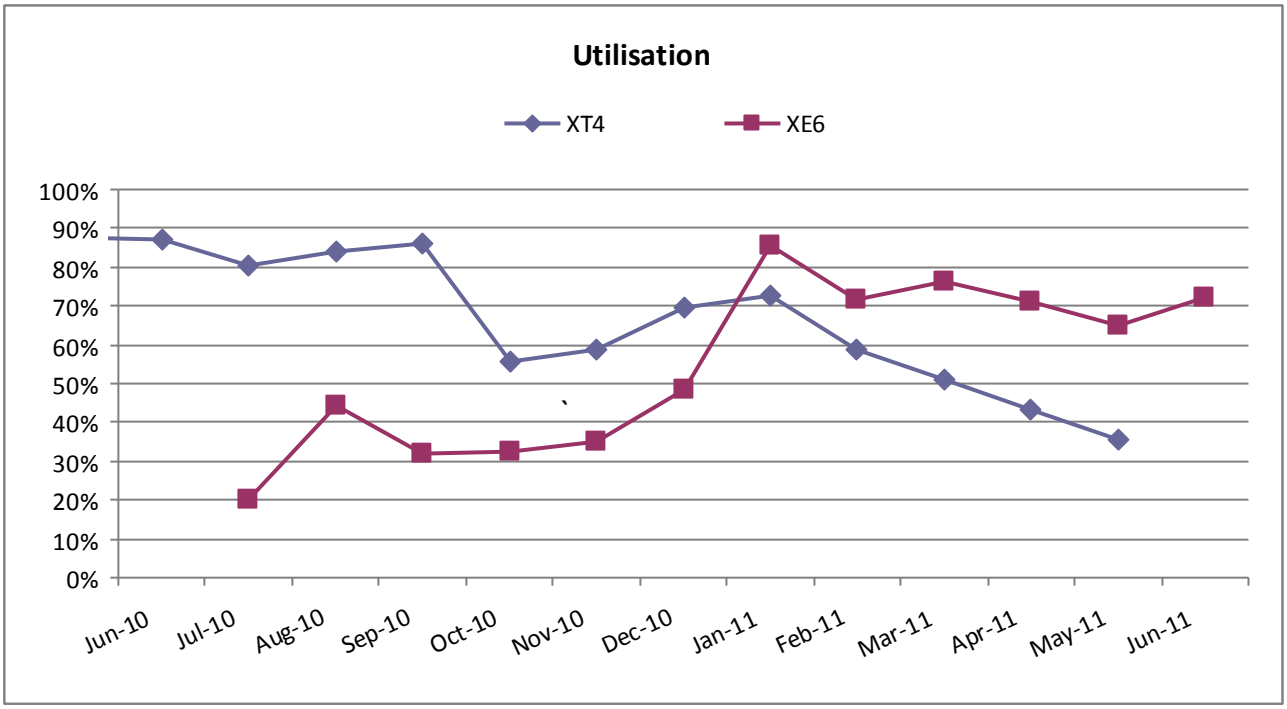
MTBF = (732)/(number of failures in a month)

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

Attribution	Metric	Apr	May	June	Quarterly
Technology	Failures	2	1	0	3
	MTBF	366	732	∞	732
Service Provision	Failures	0	0	1	1
	MTBF	∞	∞	732	2196
External	Failures	0	1	0	1
	MTBF	∞	732	∞	2196
Overall	Failures	2	2	1	5
	MTBF	366	366	732	439

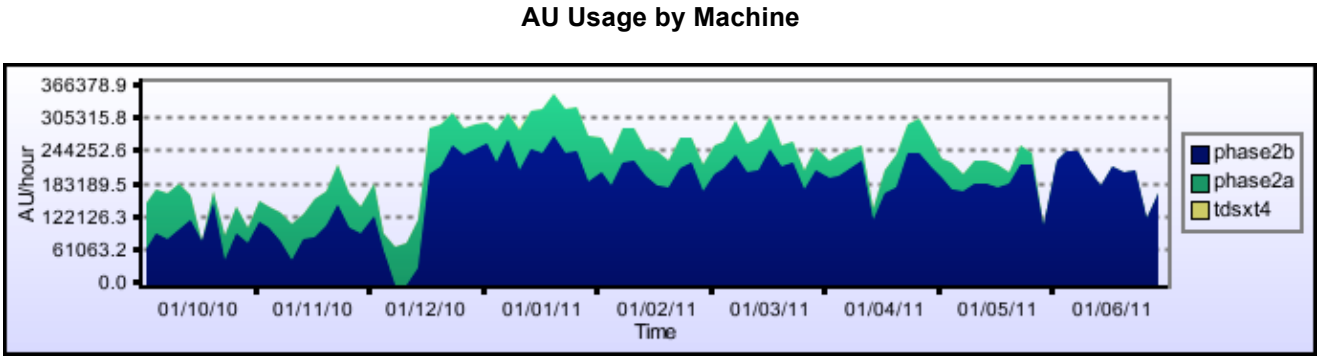
3.2 HECToR Utilisation

3.2.1 Overall Utilisation

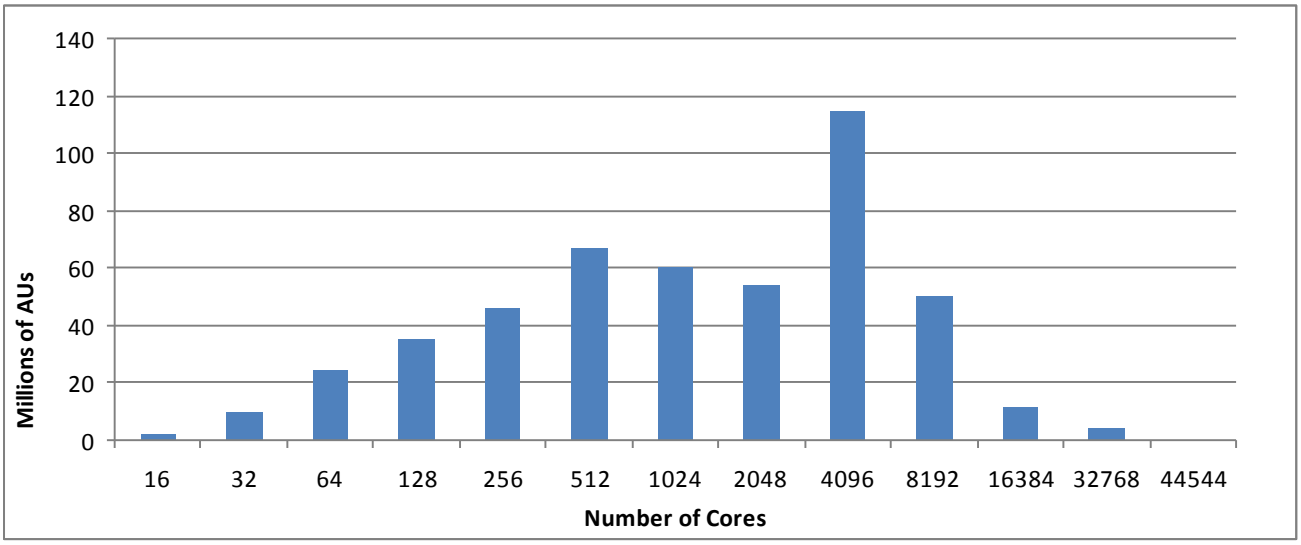


The average utilisation of the Phase2b system in 2Q11 was 69.6%.

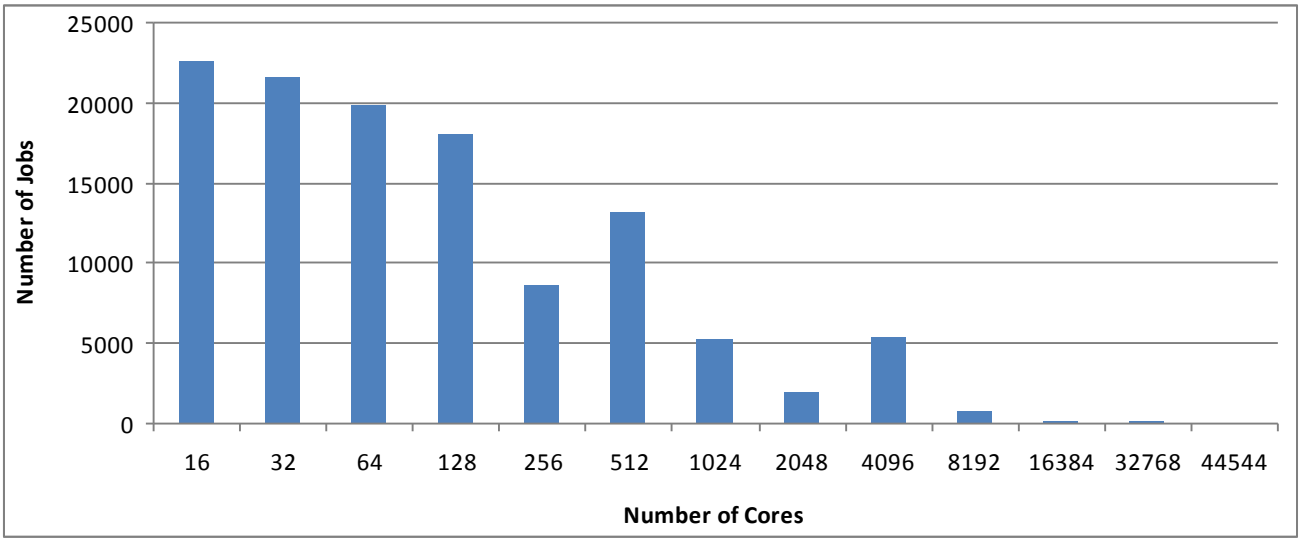
The Phase 2a utilisation quarterly average (April to June) in 2Q11 was 39.5%



3.2.2 Job Size Analysis



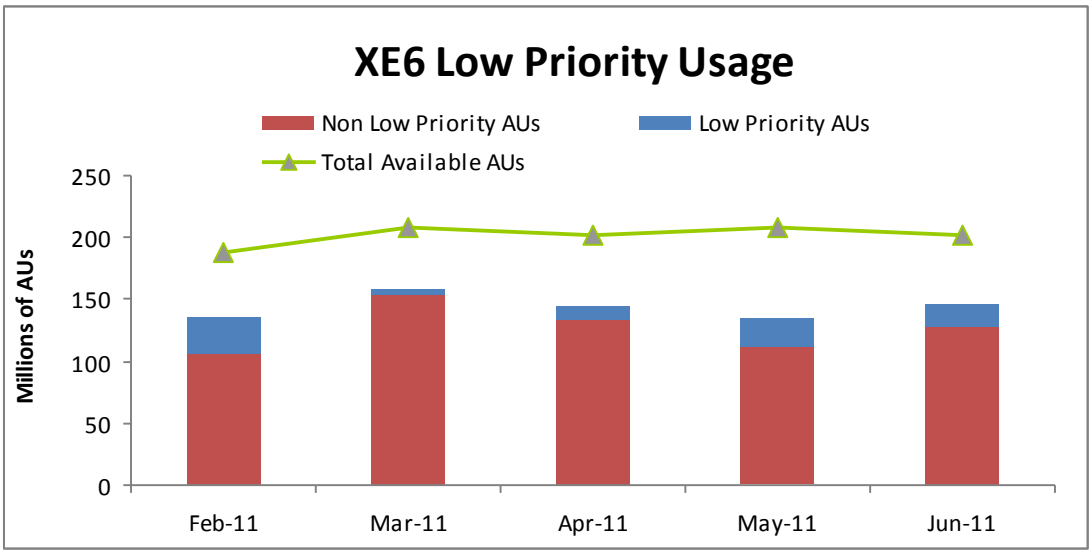
The above graph shows the AU usage on Phase 2a and Phase 2b combined across the quarter. This can then be compared to the number of jobs below.



As seen in the previous quarter, we do see a large number of small jobs although the bulk of the actual utilisation comes from the jobs in the 4096-8192 core range.

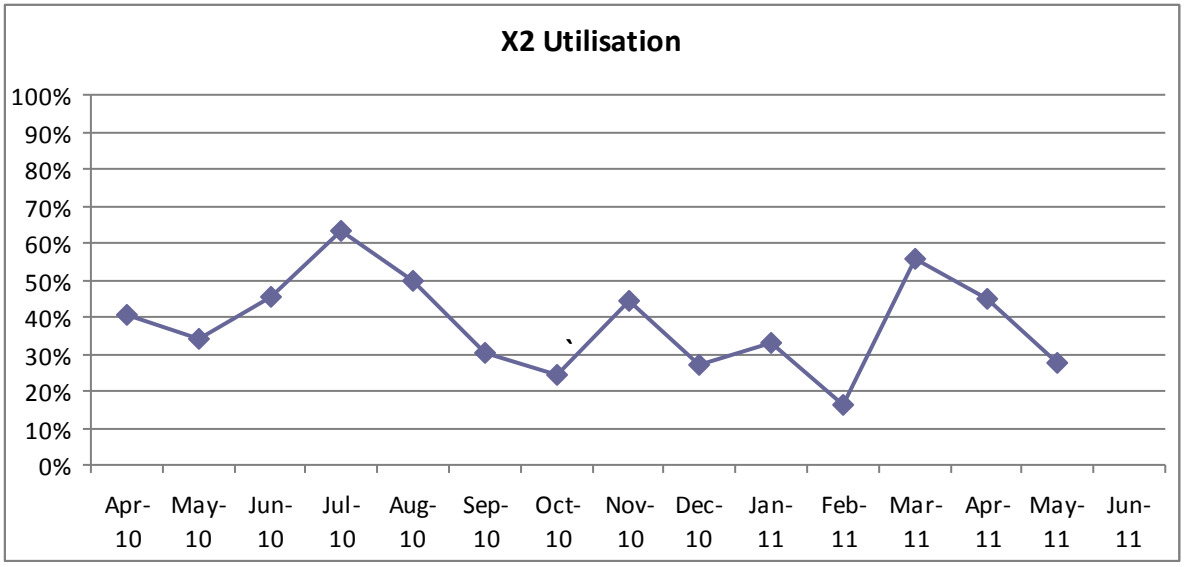
3.2.3 Low Priority Access

In 2Q11, low priority access accounted for 14.2% of the overall utilisation on the Phase 2b system.



3.2.4 X2 Utilisation

The X2 was decommissioned on 25th May 2011.

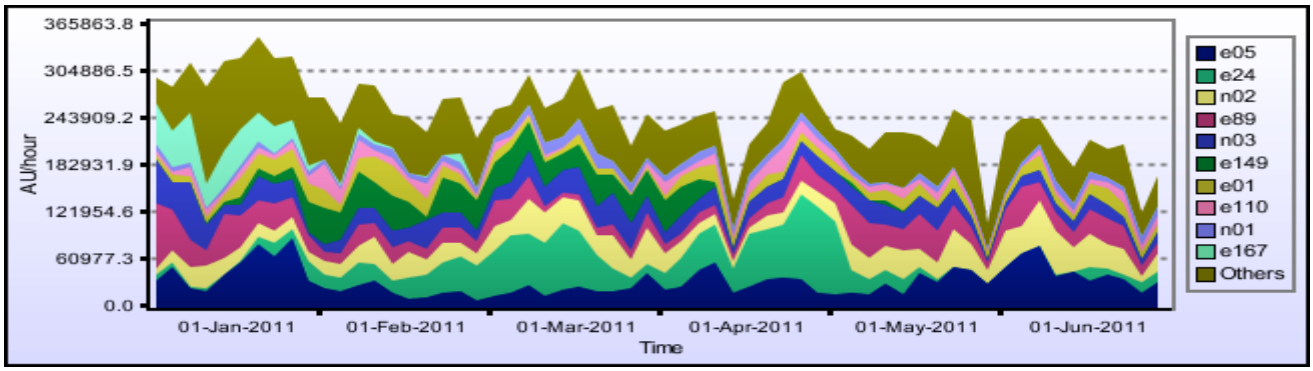


The overall X2 utilisation for 2Q11 (during April and May) was 41%.

3.2.5 Utilisation by Consortium

As below, a relatively small subset of projects contributes significantly to the overall utilisation. The end of the DEISA project (e24) in early 2Q11 is evident. We await the outcome of the DECI call to see what usage is likely to come from PRACE in 4Q11.

A number of RAP projects also closed in 2Q11.



The table below contains a summary of service utilisation by most active consortia. The full utilisation reports are available in the SAFE reports online at:

http://www.hector.ac.uk/about-us/reports/quarterly/2Q11.php

Project	phase2a (XT) %	phase2b (XE) %	phase2a (X2) %
c01	0%	0.6%	0%
e01	2.3%	3.9%	29.6%
e05	8.8%	11.5%	11.6%
e10	0.1%	0.3%	0%
e24	10.6%	7.9%	0%
e68	0%	0.4%	0%
e71	0%	0.7%	0%
e76	0%	0.1%	0%
e85	0%	0.9%	0%
e89	0.6%	8.8%	0%
e92	0%	0.2%	0%
e104	0.8%	0.1%	0%
e107	0%	0.9%	0%
e108	0%	0.1%	0%
e110	0.3%	3.4%	0%
e117	0%	1.2%	0%
e122	0%	0.4%	0%
e124	0%	0.2%	0%
e125	0%	0.1%	0%
e126	0%	0.5%	0%
e128	0%	0.6%	0%
e141	0%	0.5%	0%
e149	0%	1.5%	0%
e171	0%	0.2%	0%
e177	0%	0.1%	0%
e185	0.1%	0%	0%

e186	1.4%	0.5%	0%
e188	0%	0.2%	0%
e189	0%	0.9%	0%
e191	1.4%	0%	0%
e192	0%	0.4%	0%
e193	0%	2.2%	0%
e194	0%	0.7%	0%
e195	0.1%	1%	0%
e199	0%	0.1%	0%
EPSRC Total	26.6%	51.2%	41.2%
n01	0%	2.6%	0%
n02	8.8%	7.7%	0%
n03	2.5%	5.8%	0%
n04	0%	0.9%	0%
NERC Total	11.3%	17%	0%
b10	0%	0.1%	0%
BBSRC Total	0%	0.1%	0%
p01	0%	0%	0%
STFC Total	0%	0%	0%
x01	0%	0.4%	0%
External Total	0%	0.4%	0%
d11	0%	0.1%	0%
d19	1.1%	0%	0%
d25	0.3%	0.4%	0%
d28	0%	0.1%	0%
Directors Time Total	1.4%	0.7%	0%
y02	0%	0.1%	0%
z03	0.1%	0.2%	0%
Internal Total	0.1%	0.3%	0%
Overall Total	**39.5%**	**69.6%**	**41.2%**

3.3 Helpdesk

A total of 1227 queries with a specified service metric were completed in this period. There were also 87 queries without a metric completed.

Helpdesk Targets

Metric	Pass	Total	Fraction	Target
All queries finished in 1 day	1045	1057	98.9%	97.0%
Admin queries finished in 1 day	947	955	99.2%	97.0%
Queries assigned in 30 min	1205	1212	99.4%	97.0%
Technical assessments in 10 days	23	25	91.7%	97.0%

Queries by Service Metric

Service Metric	Queries	Percentage
Automatic	701	53.35%
Admin	254	19.33%
In-depth	145	11.04%
Technical	102	7.76%
No Metric	87	6.62%
Technical assessment	25	1.90%

Queries by Category

Query Category	Queries	Percentage
Set user quotas	176	13.4%
New User	176	13.4%
New Password	140	10.7%
Set group quotas	104	7.9%
Access to HECToR	85	6.5%
3rd Party Software	83	6.3%
Disk, tapes, resources	81	6.2%
Node Failure	53	4.0%
User behaviour	50	3.8%
Compilers and system software	49	3.7%
Batch system and queues	44	3.3%
New Group	31	2.4%
Login, passwords and ssh	31	2.4%
User programs	28	2.1%
Other	26	2.0%
None	26	2.0%
Add to group	22	1.7%
Join Project	18	1.4%
Remove account	16	1.2%
SAFE	14	1.1%
Courses	13	1.0%
gpu	11	0.8%
Static website	7	0.5%

Update account	6	0.5%
Performance and scaling	4	0.3%
Delete from group	4	0.3%
Make Reservation	3	0.2%
Grid	3	0.2%
Delete from project	3	0.2%
Archive	3	0.2%
Remove project	1	0.1%
Remove project	1	0.1%
Porting	1	0.1%
Network	1	0.1%
Create certificate	1	0.1%

Queries by Handler Category

Handlers	Auto	In-depth	Technical	Admin	Technical Assessment	Total	%age
OSG	701	2	25	26		754	61.45%
USL		31	53	227		311	25.35%
CSE		75	2		25	102	8.31%
Cray		37	22	1		60	4.89%

3.3.1 Quality Tokens

A total of 14 positive quality tokens were set by users during 2Q11. No negative tokens were received.

Date	Tokens Awarded	Comment	Consortium
05/05/2011	* * * * *	Five positive tokens. No comment from the user	e05
07/06/2011	* * * *	Four positive tokens. No comment from the user	e05
22/06/2011	* * * * *	Five positive tokens. No comment from the user	n01/n02

3.4 Performance Metrics

Metric	TSL(%)	FSL(%)	Apr-11	May-11	Jun-11	2Q11
Technology reliability (%)	85.0%	98.5%	97.1%	99.1%	100.0%	98.7%
Technology MTBF (hours)	100	126.4	366.0	732.0	∞	732.0
Technology Throughput, hours/year	7000	8367	8326	8267	8557	8384
Capability jobs completion rate	70.0%	90.0%	100.0%	100.0%	100.0%	100.0%
Non in-depth queries resolved within 1 day (%)	85.0%	97.0%	99.3%	99.7%	97.3%	98.8%
Number of SP FTEs	7.3	8.0	8.1	10.1	10.0	9.4
SP Serviceability (%)	80.0%	99.0%	100.0%	100.0%	99.7%	99.9%

Colour coding:

Exceeds FSL	
Between TSL and FSL	
Below TSL	

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	Project Title	Funding Body	Class	Principal Investigator	AUs allocated	AUs used	AUs left
EPSRC Projects							
c01	Support of EPSRC/STFC SLA	EPSRC	Class1a	Dr Richard Blake	50,803,723	33,224,749.10	17,578,973.90
e24	DEISA	EPSRC	Class1a	Mrs Alison Kennedy	233,146,943	227,477,420.40	5,669,522.60
e01	UK Turbulence Consortium	EPSRC	Class1a	Dr Gary N Coleman	483,969,876	58,222,655.80	425,747,220.20
e05	Materials Chemistry HPC Consortium	EPSRC	Class1a	Prof C Richard A Catlow	1,139,124,000	217,161,282.70	921,902,717.30
e10	GENIUS	EPSRC	Class1a	Prof Peter Coveney	122,748,188	9,720,399.20	113,027,788.80
e19	Edinburgh Soft Matter and Statistical Physics Group	EPSRC	Class1a	Prof Michael Cates	4,663	6,170.70	-1,507.70
e71	Simulating the control of calcite crystallisation	EPSRC	Class1a	Prof John Harding	130,403,522	47,856,975	82,546,547
e84	Vortical Mode Interactions	EPSRC	Class1a	Dr Tamer Zaki	9,600,000	3,203,117.60	6,396,882.40
e85	Study of Interacting Turbulent Flames	EPSRC	Class1a	Dr N Swaminathan	8,088,610	2,307,469.80	5,781,140.20
e89	Support for UK Car-Parrinello Consortium	EPSRC	Class1a	Dr Matt Probert	360,100,001	216,311,271.70	143,788,729.30
e92	Dynamo Action In Compressible Convection	EPSRC	Class1a	Mr Paul Bushby	4,075,000	3,820,458.10	254,541.90
e104	Fluid-Mechanical Models applied to Heart Failure	EPSRC	Class1a	Dr Nicolas Smiths	30,400,000	6,113,887.40	24,286,112.60
e105	Joint Euler/Lagrange Method for Multi-Scale Problems	EPSRC	Class1a	Dr Andreas M Kempf	1,300,000	297,322.90	1,002,677.10
e106	Numerical Simulation of Multiphase Flow: From Mesocales to	EPSRC	Class1a	Prof Kai Luo	3,650,000	0	3,650,000

Code	Project Title	Funding Body	Class	Principal Investigator	AUs allocated	AUs used	AUs left
e107	Parallel Brain Surgery Simulation	EPSRC	Class1a	Dr Stephane P. A. Bordas	6,000,000	708,878.50	5,291,121.50
e108	Jet Flap Noise	EPSRC	Class1a	Dr Sergey Karabasov	49,684,524	7,866,210.60	41,818,313.40
e110	Computational Aeroacoustics Consortium	EPSRC	Class1a	Prof Paul Tucker	99,100,000	51,362,730.70	47,737,269.30
e122	Multiscale Modelling of Magnetised Plasma Turbulence	EPSRC	Class1a	Dr Colin M Roach	65,000,000	24,838,940.50	40,161,059.50
e124	Compressible Axisymmetric Flows	EPSRC	Class1a	Dr Richard D Sandberg	22,887,943	7,536,030.80	15,351,912.20
e125	Full configuration interaction quantum monte carlo	EPSRC	Class1a	Dr Ali Alavi	18,324,825	5,249,375.50	13,075,449.50
e126	Clean Coal Combustion: Burning Issues of Syngas Burning	EPSRC	Class1a	Prof Xi Jiang	25,584,000	7,344,703.60	18,239,296.40
e127	Alternative drag-reduction strategies	EPSRC	Class1a	Prof Michael Leschziner	7,000,000	567,467.50	6,432,532.50
e128	Rate-Controlled Constrained Equilibrium	EPSRC	Class1a	Dr Stelios Rigopoulos	7,092,134	3,249,951.40	3,842,182.60
e129	Novel Hybrid LES-RANS schemes [ICL]	EPSRC	Class1a	Prof Michael Leschziner	7,500,000	599,443.50	6,900,556.50
e130	Novel hybrid LES-RANS schemes [MAN]	EPSRC	Class1a	Prof Dominique Laurence	10,500,000	0	10,500,000
e141	A numerical study of turbulent manoeuvering-body wakes	EPSRC	Class1a	Dr Gary N Coleman	16,350,000	2,377,450.10	13,972,549.90
e145	UK-SHEC Consortium	EPSRC	Class1a	Dr T.J. Mays	1,191,899	303,655.50	888,243.50
e149	Fractal-generated turbulence and mixing: flow physics and	EPSRC	Class1a	Prof Christos Vassilicos	68,082,500	44,870,941.70	23,211,558.30
e155	Modelling Cholesterol Deposits	EPSRC	Class1a	Dr David Quigley	10,000,000	161,741.30	9,838,258.70
e158	Novel Asynchronous Algorithms	EPSRC	Class1a	Prof Nicholas J Higham	500,000	133,672.40	366,327.60
e159	Multi-layered Abstractions for PDEs	EPSRC	Class1a	Prof Paul Kelly	3,816,000	0	3,816,000

Code	Project Title	Funding Body	Class	Principal Investigator	AUs allocated	AUs used	AUs left
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
e175	Fine-Scale Turbulence	EPSRC	Class1a	Dr Richard D Sandberg	50,000,000	51.8	49,999,948.20
e179	Non-conservative dynamics	EPSRC	Class1a	Dr Daniel Dundas	87,000,000	110,617.50	86,889,382.50
e182	Advanced Modelling of Two-Phase Reacting Flow	EPSRC	Class1a	Dr Edward S Richardson	8,150,164	0	8,150,164
e183	Analysis of Processes in Hydrocarbon Fuel Droplets	EPSRC	Class1a	Prof Sergei Sazhin	8,640,000	0	8,640,000
e184	UK-RAMP	EPSRC	Class1a	Prof Ken Taylor	130,500,000	84,503.70	130,415,496.30
e185	Chemistry of ceramic materials	EPSRC	Class1a	Prof John Harding	340,000,000	1,289,361.20	338,710,638.80
e186	Step Change in Combustion Simulation	EPSRC	Class1a	Prof Kai Luo	40,000,000	10,415,939.60	29,584,060.40
e187	IAGP: Integrated Assessment of Geoengineering Proposals	EPSRC	Class1a	Prof Piers Fosters	6,030,170	0	6,030,170
e191	CFD Analysis of Flight Dynamics	EPSRC	Class1a	Prof Kenneth Badcock	40,500,000	3,646,956	36,853,044
e202	Quantum Monte Carlo simulations	EPSRC	Class1a	Prof Matthew Foulkes	38,345,000	0	38,345,000
e203	BeatBox - Realistic Cardiac Simulations	EPSRC	Class1a	Prof Vadim Biktashev	4,400,000	0	4,400,000
e206	FLAME Agent-Based Simulation Framework	EPSRC	Class1a	Prof Christopher Greenough	410,000	0	410,000
e211	Dendrite simulation	EPSRC	Class1a	Dr Jiawei Mi	300,000	0.1	299,999.90
j01	JST	EPSRC	Class1a	Dr Andrew R Turner	71,990,708	34,931	71,955,777

Code	Project Title	Funding Body	Class	Principal Investigator	AUs allocated	AUs used	AUs left
STFC Projects							
p01	Atomic Physics for APARC	STFC	Class1a	Dr Penny Scott	10,002,701	660,645.80	9,342,055.20
NERC Projects							
n01	Global Ocean Modelling Consortium	NERC	Class1a	Dr Thomas Anderson	144,335,502.20	79,805,096	64,530,406.10
n02	NCAS (National Centre for Atmospheric Science)	NERC	Class1a	Dr Lois Steenman-Clark	407,282,294.20	307,865,821.10	99,416,473.10
n03	Computational Mineral Physics Consortium	NERC	Class1a	Prof John P Brodholt	397,647,014.20	288,158,450	109,488,564.20
n04	Shelf Seas Consortium	NERC	Class1a	Dr Roger Proctor	104,161,498.40	73,188,672.40	30,972,826
BBSRC Projects							
b12	Flu Analysis on HECToR	BBSRC	Class1a	Mr Adrian Jackson	50,000	0.1	49,999.90
b13	Linear Scaling DFT for Biochemistry Applications	BBSRC	Class1a	Dr David Bowler	5,587,200	0	5,587,200
b100	Widening the BBSRC HPC User Base	BBSRC	Class1a	Dr Michael Ball	10,000,000	632,469.40	9,367,530.60
b10	SPRINTing with HECToR [dCSE]	BBSRC	Class2b	Mr Terry Sloan	1,595,120	519,054.20	1,076,065.80
Director's Time							
d04	MSc in HPC	DirectorsTime	Service	Dr David Henty	343,500	251,571.30	91,928.70
d11	NAIS	DirectorsTime	Service	Prof Mark Ainsworth	10,000,001	1,061,280.10	8,938,720.90
d15	HPC-GAP	DirectorsTime	Service	Dr David Henty	2,033	1,044.40	988.6
d16	ETC	DirectorsTime	Service	Dr Lorna Smith	501,000	164,023.10	336,976.90

Code	Project Title	Funding Body	Class	Principal Investigator	AUs allocated	AUs used	AUs left
d19	OpenFOAM Demo	DirectorsTime	Service	Dr Alan Gray	1,950,000	1,893,850	56,150
d21	GADGET	DirectorsTime	Service	Dr Adrian Jenkins	1,000,001	18,584.10	981,416.90
d23	TEXT FP7	DirectorsTime	Service	Dr Mark Bull	1,500,000	19,901.70	1,480,098.30
d24	SBSI	DirectorsTime	Service	Dr Stephen Gilmore	2,000,000	958,105.70	1,041,894.30
d25	Code Scaling	DirectorsTime	Service	Dr Ken Rice	51,500,000	5,322,760.90	46,177,239.10
d26	Guest Training Accounts	DirectorsTime	Service	Miss Elizabeth Sim	50,000	17,259.90	32,740.10
d27	RollsRoyce	DirectorsTime	Service	Mr Paul Graham	50,000	1,268.60	48,731.40
d28	Simulations of antimicrobial peptides	DirectorsTime	Class1a	Dr Andrew R Turner	2,000,000	317,043.60	1,682,956.40
d29	Nu-FuSe	DirectorsTime	Service	Mr Adrian Jackson	500,000	4.4	499,995.60
d30	PARTRAC	DirectorsTime	Service	Dr Mark Sawyer	200,000	0	200,000
d31	Semileptonic Decay	DirectorsTime	Service	Prof Richard Kenway	1,000,001	0	1,000,001
d32	APOS-EU	DirectorsTime	Service	Dr Michele Weiland	1,000,000	0	1,000,000
d33	Mark Westwood's Project	DirectorsTime	Service	Mr Mark Westwood	100,000	8,932.10	91,067.90
External Projects							
x01	HPC-Europa	External	Service	Dr Judy Hardy	23,886,237	11,680,469.20	12,205,767.80