



HECToR Quarterly Report

July – Sep 2011

1 Introduction

This report covers the period from 1 July 2011 at 0800 to 1 Sep 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/3Q11.php>

2 Executive Summary

- Reliability was exceptional in Q3, with only 1 failure, and an overall MTBF of 2196 hours.
- Utilisation on the XE6 averaged 64% for the quarter. July was quiet due to esFS migration work, however utilisation increased in August and September. Further details are available in Section 3 of the report.
- Utilisation on HECToR from our JST users in Japan ramped up in Q3. There are now four subprojects running on HECToR, accounting for 2.8% of the overall utilisation. .
- Initial user groups started work on the HECToR GPGPU in June. The test system was 40% utilised from June to October. Further details are available in Section 3.
- The helpdesk statistics were again excellent. In addition, 25 positive quality tokens were received from users in 3Q11, no negative tokens were received.
- Plans for Phase 3 were confirmed in early October. HECToR will be upgraded to Interlagos in November, with acceptance testing planned for late November/early December.

3 Quantitative Metrics

3.1 Reliability

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

	Jul	Aug	Sep
Incidents	12	11	18
Failures	0	1	0

3.1.1 Performance Statistics

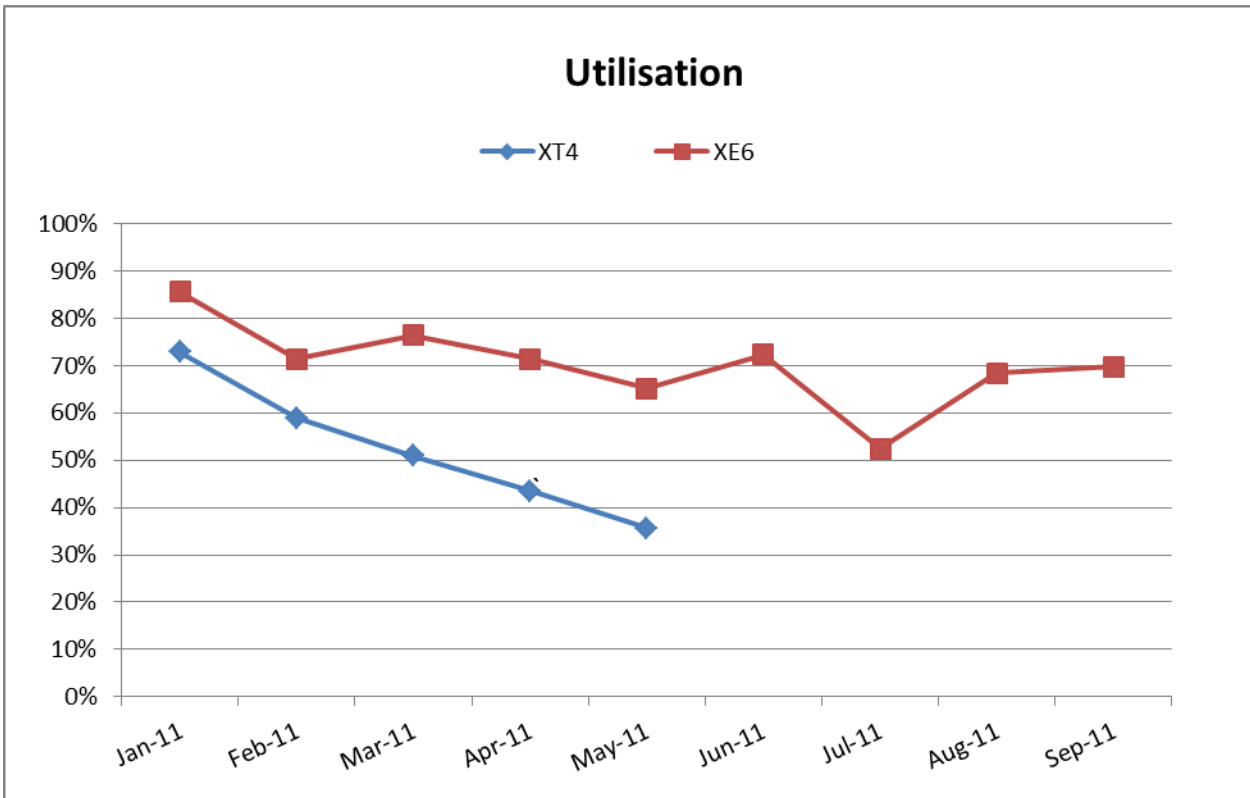
MTBF = (732)/(number of failures in a month)

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

Attribution	Metric	Jul	Aug	Sep	Quarterly
Technology	Failures	0	0	0	0
	MTBF	∞	∞	∞	∞
Service Provision	Failures	0	0	0	0
	MTBF	∞	∞	∞	∞
External	Failures	0	0	0	0
	MTBF	∞	∞	∞	∞
Other/Unknown	Failures	0	1	0	1
	MTBF	∞	732	∞	2196
Overall	Failures	0	1	0	1
	MTBF	∞	732	∞	2196

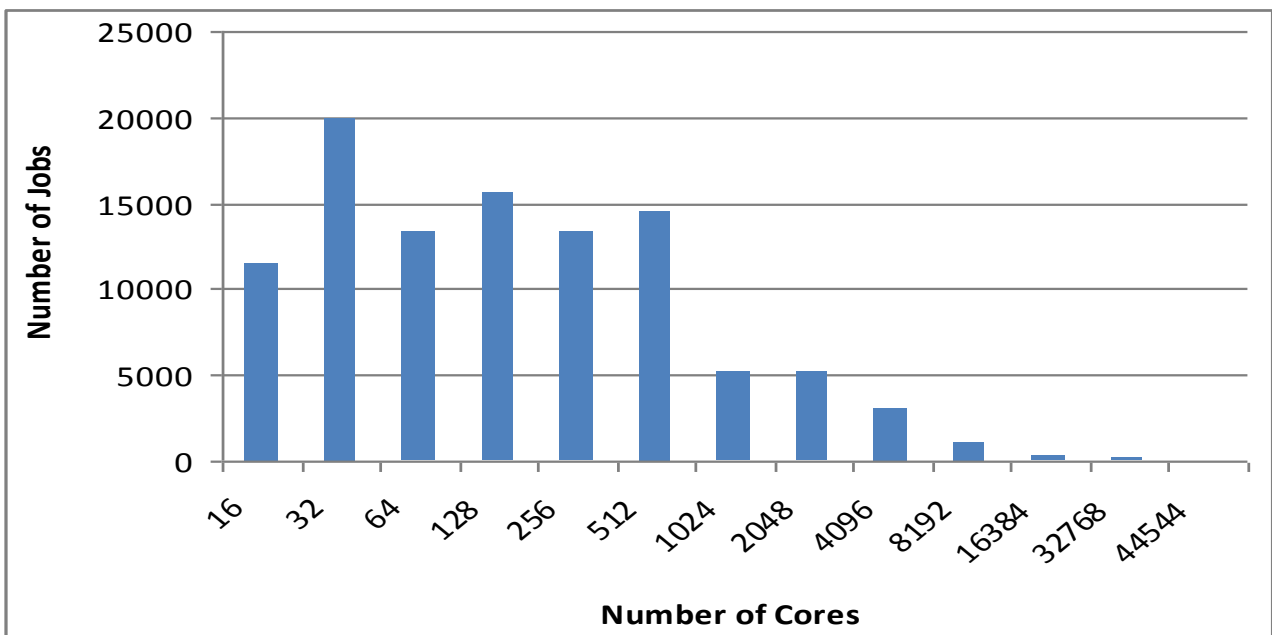
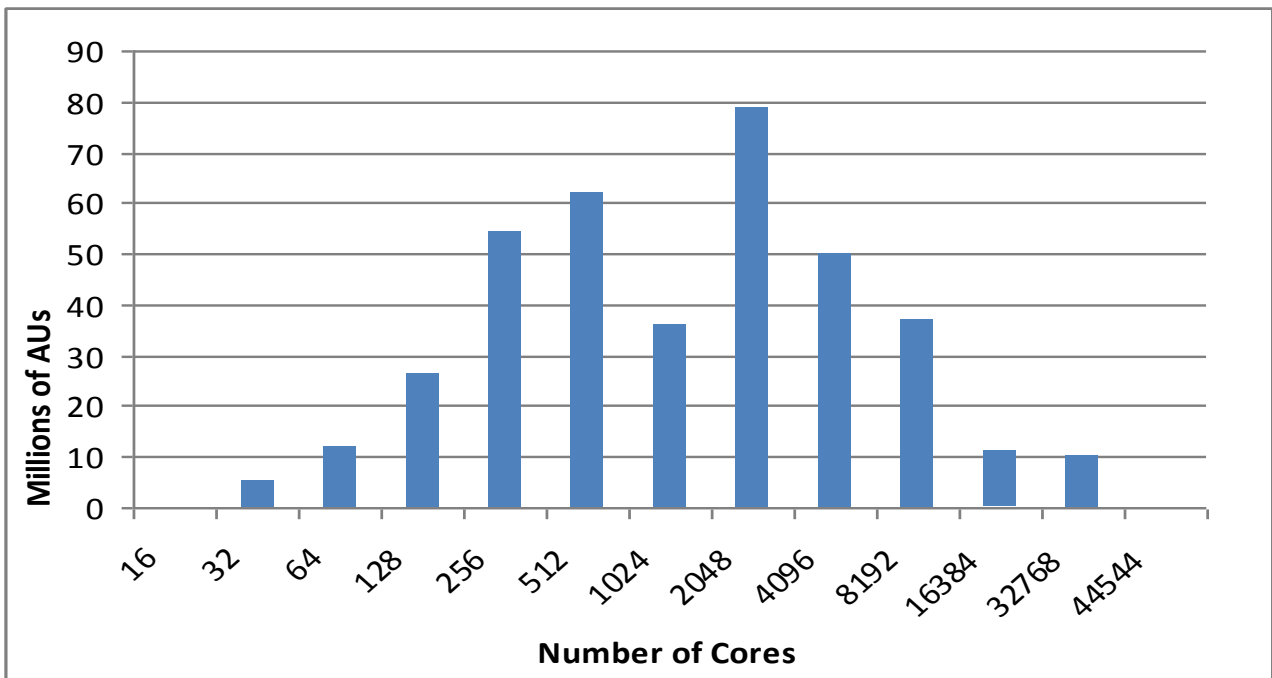
3.2 HECToR Utilisation

3.2.1 Overall Utilisation



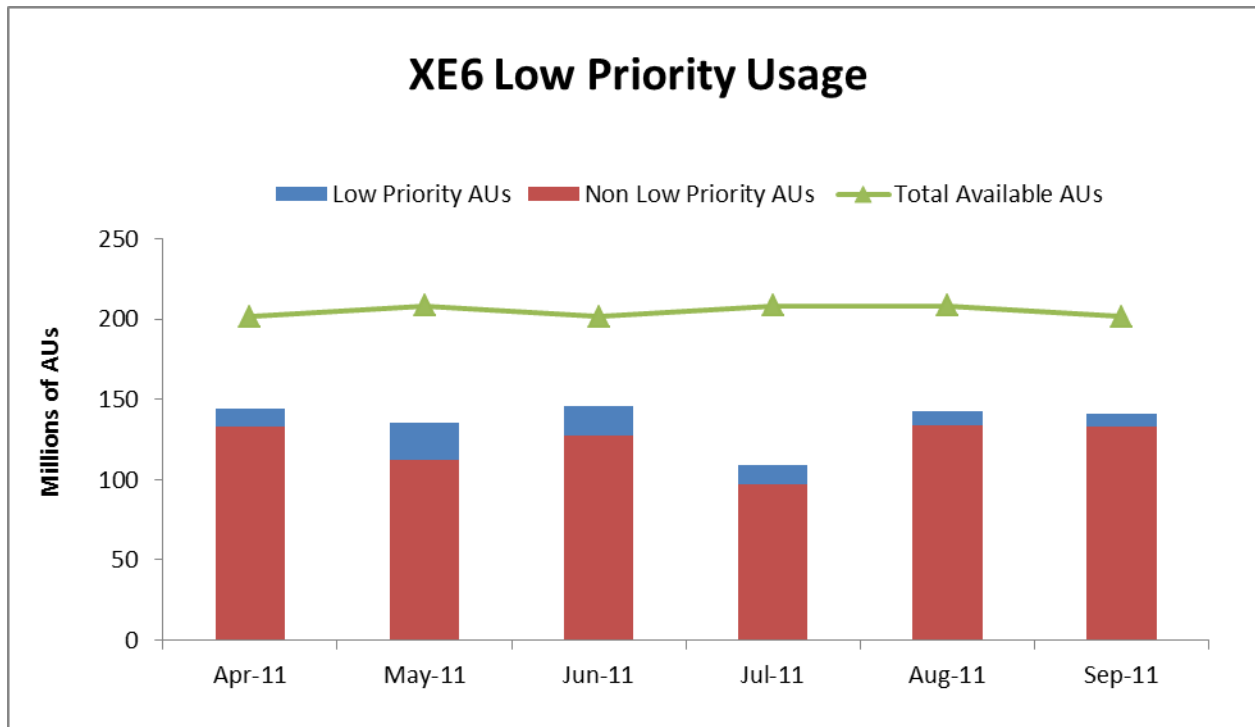
The average utilisation of the Phase2b system in 3Q11 was 63.5%. Utilisation was low during July, but returned to normal levels in August. During July, a combination of the summer holiday period, and the migration of data to the secondary external lustre filesystem may have contributed to the lower than normal utilisation.

3.2.2 Job Size Analysis



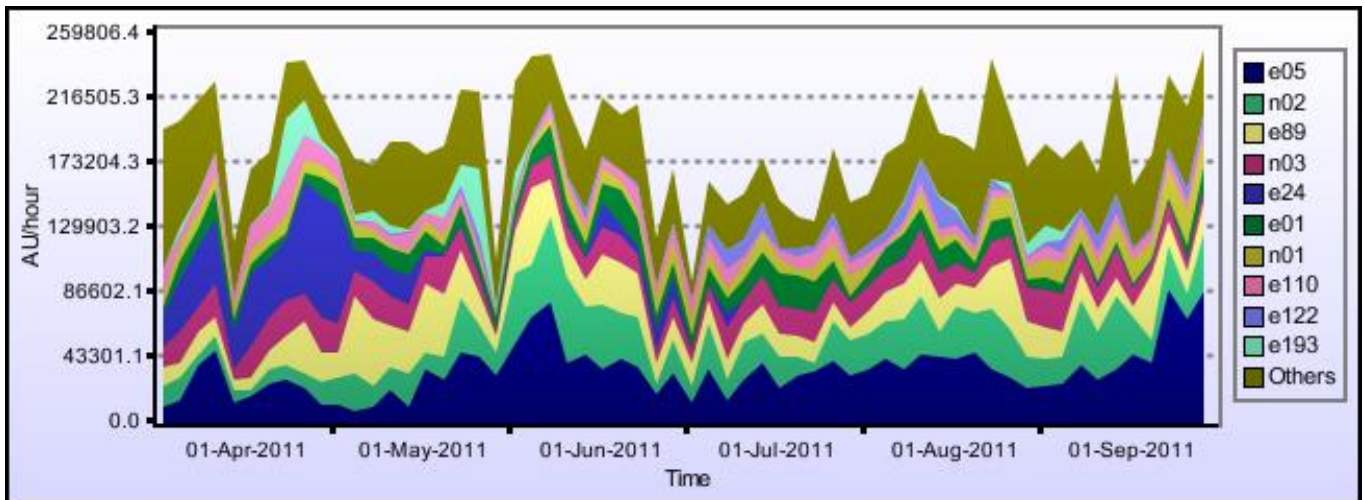
3.2.3 Low Priority Access

In 3Q11, low priority access accounted for 8% of the overall utilisation on the Phase 2b system. This was a reduction from 14% in the previous quarter.



3.2.5 Utilisation by Consortium

As below, a relatively small subset of projects contributes significantly to the overall utilisation.



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:

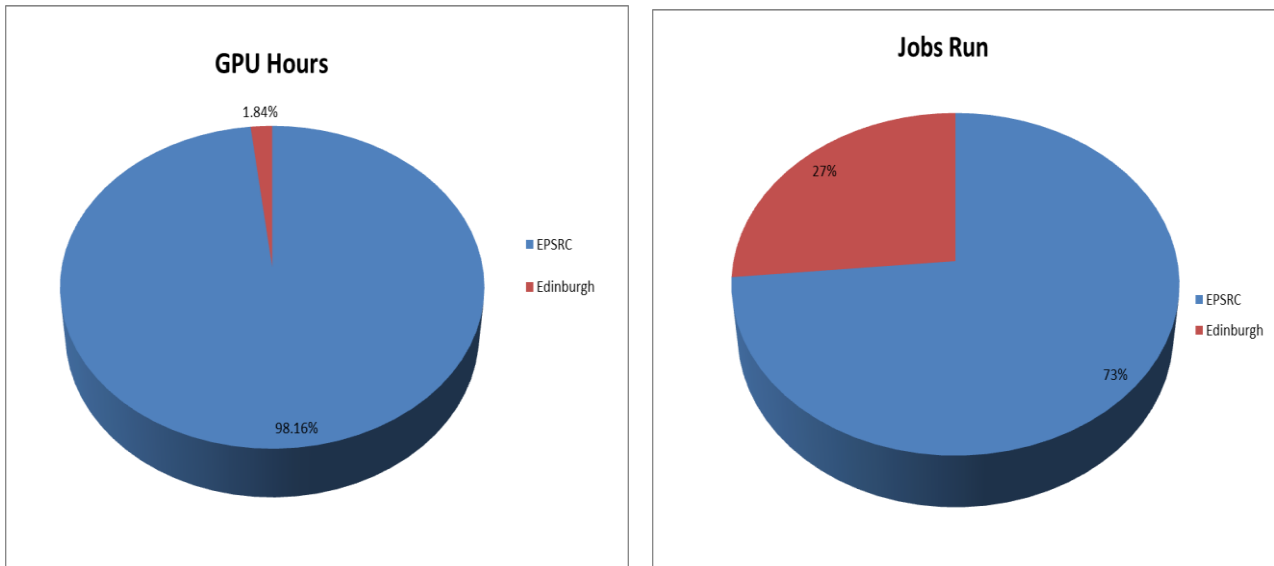
<http://www.hector.ac.uk/about-us/reports/quarterly/3Q11.php>

Project	Utilisation
y02	0.01%
z03	0.34%
Internal Total	0.36%
c01	1.07%
e01	2.14%
e05	17.20%
e24	0.04%
e68	0.07%
e71	0.28%
e76	0.09%
e85	1.30%
e89	6.56%
e92	0.13%
e104	0.17%
e108	2.41%
e110	2.36%
e122	2.21%
e125	1.52%
e130	0.21%
e139	0.01%
e141	0.03%
e148	0.02%
e149	0.11%
e152	0.04%
e158	0.02%
e173	0.07%

Project	Utilisation
e184	0.02%
e185	1.42%
e186	0.23%
e191	0.10%
e193	0.60%
e205	0.01%
e208	0.01%
e210	0.01%
e215	0.27%
e216	0.02%
e217	0.15%
e219	0.19%
e222	0.26%
e227	0.02%
j01	2.75%
EPSRC Total	44.17%
n01	5.41%
n02	10.04%
n03	5.19%
n04	1.84%
NERC Total	22.48%
b13	0.00%
BBSRC Total	0.00%
p01	0.00%
STFC Total	0.00%
x01	1.05%
External Total	1.05%
d25	0.14%
d26	0.01%
d28	1.63%
d32	0.02%
Directors Time Total	1.80%
Total	69.85%

3.2.6 HECToR GPGPU Testbed Utilisation

The HECToR GPGPU testbed came into service in late May11. A number of projects have been running on the test system since June.



There is no 'AU' cost associated with the GPU, but usage is recorded on a very basic GPU Hour basis. Overall, the GPU was 40% utilised. Although a number of users groups are actively developing applications, nearly all the utilisation was from a single user group using a GPU-enabled package.

Per Project Usage

As above, the majority of GPU usage has come from the EPSRC projects. Three projects were approved by EPSRC for a period of 6 months - 2 EPSRC groups and 1 NERC group have been running on the GPU.

The EPSRC usage also included a training course run in July on the GPU by Oxford and NAG, as part of the EPSRC Short Course Program.

Project/PI	Usage	Number Of Jobs
Lee Margetts	0.3%	513
Carmen Domene	97.7%	703
Grenville Lister	0.0%	94
GPGPU Training	0.2%	1333
Edinburgh Projects	1.8%	953

3.3 Helpdesk

A total of 1614 queries with a specified service metric were completed in this period. There were 16 queries without a metric completed in the same period.

Helpdesk Targets

Metric	Pass	Total	Fraction	Target
All queries finished in 1 day	1462	1481	98.7%	97.0%
Admin queries finished in 1 day	1415	1433	98.7%	97.0%
Queries assigned in 30 min	1602	1608	99.6%	97.0%
Technical assessments in 10 days	16	16	100%	97.0%

Queries by Service Metric

Service Metric	Queries	Percentage
Automatic	1176	72.1%
Admin	257	15.8%
In-depth	117	7.2%
Technical	48	2.9%
No Metric	16	1.0%
Technical assessment	16	1.0%

Queries by Category

Query Category	Queries	Percentage
Set group quotas	493	30.2%
Set user quotas	356	21.8%
New User	136	8.3%
New Password	80	4.9%
3rd Party Software	65	4.0%
Disk, tapes, resources	63	3.9%
Compilers and system software	49	3.0%
None	44	2.7%
User behaviour	43	2.6%
Batch system and queues	42	2.6%
Access to HECToR	38	2.3%
Make Reservation	37	2.3%
User programs	24	1.5%
Add to group	24	1.5%
Login, passwords and ssh	23	1.4%
Join Project	18	1.1%
New Group	17	1.0%
Node Failure	16	1.0%
Other	14	0.9%
SAFE	12	0.7%
Courses	8	0.5%
Delete from group	7	0.4%
Update account	6	0.4%

Archive	5	0.3%
Porting	3	0.2%
Network	3	0.2%
Remove account	2	0.1%
Static website	1	0.1%
Delete from project	1	0.1%

Queries by Handler Category

Handlers	Automatic	In-depth	Admin	Technical	Technical Assessment	TOTAL	%age
OSG	1176	3	29	15		1223	75.8%
CSE		65		1	16	82	5.1%
USL		28	227	23		278	17.2%
Cray		21	1	9		31	1.9%

3.3.1 Quality Tokens

A total of 25 positive quality tokens were set by users during 3Q11. No negative tokens were received.

Date	Tokens Awarded	Comment	Consortium
01-Jul-2011	* * * * * (five positive tokens)	<i>Everything working beautifully.</i>	n01
10-Aug-2011	* (one positive token)	<i>HECToR very sluggish in last 24 hours.</i>	n01
10-Aug-2011	* * * * * (five positive tokens)	<i>Performance back to normal.</i>	n01
28-Aug-2011	* * * * * (four positive tokens)	<i>Great service! Could perhaps do with reviewing the current 12 hour run limit though.</i>	e05
22-Sep-2011	* * * * * (five positive tokens)	No comment from user	x01
29-Sep-2011	* * * * * (five positive tokens)	No comment from user	e139

3.4 Performance Metrics

Metric	TSL(%)	FSL(%)	Jul-11	Aug-11	Sep-11	3Q11
Technology reliability (%)	85.0%	98.5%	100.0%	100.0%	100.0%	100.0%
Technology MTBF (hours)	100	126.4	∞	∞	∞	∞
Technology Throughput, hours/year	7000	8367	8647	8621	8784	8491
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%	97.3%	98.5%	98.7%	98.2%
Number of SP FTEs	7.3	8.0	8.5	8.5	9.1	8.7
SP Serviceability (%)	80.0%	99.0%	100.0%	100.0%	100.0%	100.0%

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	36,945,665	13,858,057
e01	UK Turbulence Consortium	EPSRC	Class1a	Dr Gary N Coleman	483,969,876	73,777,125	410,192,750
e05	Materials Chemistry HPC Consortium	EPSRC	Class1a	Prof C Richard A Catlow	1,139,124,000	288,709,872	850,354,127
e10	GENIUS	EPSRC	Class1a	Prof Peter Coveney	257,748,189.10	9,804,092	247,944,096
e71	Simulating the control of calcite crystallisation	EPSRC	Class1a	Prof John Harding	130,403,522	48,952,199	81,451,322
e84	Vortical Mode Interactions	EPSRC	Class1a	Dr Tamer Zaki	9,600,000	3,203,117	6,396,882
e85	Study of Interacting Turbulent Flames	EPSRC	Class1a	Dr N Swaminathan	8,088,610	2,323,982	5,764,627
e89	Support for UK Car-Parrinello Consortium	EPSRC	Class1a	Dr Matt Probert	360,100,001	246,114,395	113,985,605
e104	Fluid-Mechanical Models applied to Heart Failure	EPSRC	Class1a	Dr Nicolas Smiths	30,400,000	6,899,846	23,500,154
e105	Joint Euler/Lagrange Method for Multi-Scale Problems	EPSRC	Class1a	Dr Andreas M Kempf	1,300,000	297,322	1,002,677
e106	Numerical Simulation of Multiphase Flow: From Mesoscales 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	712,960	5,287,039
e108	Jet Flap Noise	EPSRC	Class1a	Dr Sergey Karabasov	49,684,524	14,069,077	35,615,446
e110	Computational Aeroacoustics Consortium	EPSRC	Class1a	Prof Paul Tucker	140,110,347	56,800,337	83,310,010

Code	Project Title	Funding Body	Class	Principal Investigator	AUs allocated	AUs used	AUs left
e122	Multiscale Modelling of Magnetised Plasma Turbulence	EPSRC	Class1a	Dr Colin M Roach	65,000,000	32,871,016	32,128,983
e124	Compressible Axisymmetric Flows	EPSRC	Class1a	Dr Richard D Sandberg	22,887,943	7,909,206	14,978,737
e125	Full configuration interaction quantum monte carlo	EPSRC	Class1a	Dr Ali Alavi	168,324,825	9,747,676	158,577,148
e126	Clean Coal Combustion: Burning Issues of Syngas Burning	EPSRC	Class1a	Prof Xi Jiang	25,584,000	8,271,357	17,312,642
e127	Alternative drag-reduction strategies	EPSRC	Class1a	Prof Michael Leschziner	7,000,000	1,167,944	5,832,055
e128	Rate-Controlled Constrained Equilibrium	EPSRC	Class1a	Dr Stelios Rigopoulos	7,092,134	3,434,978	3,657,155
e129	Novel Hybrid LES-RANS schemes [ICL]	EPSRC	Class1a	Prof Michael Leschziner	7,500,000	610,642	6,889,357
e130	Novel hybrid LES-RANS schemes [MAN]	EPSRC	Class1a	Prof Dominique Laurence	10,500,000	1,175,659	9,324,340
e141	A numerical study of turbulent manoeuvring-body wakes	EPSRC	Class1a	Dr Gary N Coleman	16,350,000	3,290,772	13,059,227
e145	UK-SHEC Consortium	EPSRC	Class1a	Dr T.J. Mays	1,191,899	333,649	858,249
e149	Fractal-generated turbulence and mixing: flow physics and	EPSRC	Class1a	Prof Christos Vassilicos	68,082,500	46,541,929	21,540,570
e152	Turbulent entrainment	EPSRC	Class1b	Dr Maarten van Reeuwijk	22,212,628	10,034,039	12,178,588
e155	Modelling Cholesterol Deposits	EPSRC	Class1a	Dr David Quigley	10,000,000	161,741	9,838,258
e156	Metal Conquest: efficient simulation of metals on petaflop	EPSRC	Class2b	Dr David Bowler	1,600,000	56,668	1,543,331
e158	Novel Asynchronous Algorithms	EPSRC	Class1a	Prof Nicholas J Higham	500,000	278,497	221,502
e159	Multi-layered Abstractions for PDEs	EPSRC	Class1a	Prof Paul Kelly	3,816,000	11,639	3,804,360
e160	Sustainable Software Generation Tools	EPSRC	Class1a	Prof Paul Kelly	20,208,060	930	20,207,129

Code	Project Title	Funding Body	Class	Principal Investigator	AUs allocated	AUs used	AUs left
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
e168	TEXT	External	Service	Dr Mark Bull	1,500,000	0	1,500,000
e173	Performance of oomph-lib in largescale parallel computations	EPSRC	Class1b	Prof Matthias Heil	4,800,000	198,979	4,601,020.60
e175	Fine-Scale Turbulence	EPSRC	Class1a	Dr Richard D Sandberg	50,000,000	39,182	49,960,817.90
e179	Non-conservative dynamics	EPSRC	Class1a	Dr Daniel Dundas	87,000,000	705,655	86,294,344.60
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	132,210	130,367,789
e185	Chemistry of ceramic materials	EPSRC	Class1a	Prof John Harding	340,000,000	6,033,068	333,966,931.2
e186	Step Change in Combustion Simulation	EPSRC	Class1a	Prof Kai Luo	40,000,000	16,971,954	23,028,045.60
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	4,362,192	36,137,808
e193	Colloids in Cholesteric Liquid Crystals	EPSRC	Class1b	Dr Davide Marenduzzo	28,793,931	14,697,609	14,096,322
e199	Microstructurally Faithful Modelling of Materials	EPSRC	Class2b	Dr Lee Margetts	800,000	522,577	277,422.60
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	316.	4,399,683

Code	Project Title	Funding Body	Class	Principal Investigator	AUs allocated	AUs used	AUs left
e204	Rare Events via Parallel Forward Flux Sampling	EPSRC	Class1a	Dr Rosalind Allen	5,000,000	0	5,000,000
e205	Feasibility study of fine sediment transport	EPSRC	Class1b	Dr Ming Li	3,000,000	76,812	2,923,187
e206	FLAME Agent-Based Simulation Framework	EPSRC	Class1a	Prof Christopher Greenough	410,000	0	410,000
e207	Developing DL_POLY Molecular Dynamics Simulation code	EPSRC	Class1a	Dr Kostya Trachenko	25,857,630	0	25,857,630
e208	Plutonium (IV) Hydration and Hydrolysis	EPSRC	Class2a	Prof Nikolas Kaltsoyannis	300,000	147,734	152,265
e209	Rheology of dense granular flows	EPSRC	Class2a	Dr Jin Sun	300,000	0	300,000
e210	The Defect Chemistry of TiO ₂	EPSRC	Class2a	Prof Russell Howe	300,000	170,002	129,997
e211	Dendrite simulation	EPSRC	Class1a	Dr Jiawei Mi	300,000	962	299,037.40
e213	Condensation/Evaporation Heat Transfer in Micro/Nanochannels	EPSRC	Class2a	Dr Huasheng Wang	400,000	0	400,000
e214	MD Studies of Low Salinity Enhanced Oil Recovery Mechanisms	EPSRC	Class1b	Prof Peter Coveney	3,086,611	0	3,086,611
e215	GIPAW DFT Calculation of NMR Parameters in Rare Earth Materials	EPSRC	Class1b	Dr John V Hanna	8,170,000	1,118,186	7,051,813
e216	Self-organised Lipid layers on Mercury	EPSRC	Class1b	Dr Pietro Ballone	1,534,980	95,183	1,439,797
e217	Exploring a Conformational Switch in a Macromolecule	EPSRC	Class1b	Dr Philip Biggin	2,835,439	420,540	2,414,899
e218	Computational Electron Collision Experiments using 2DRMP	EPSRC	Class1b	Dr Penny Scott	1,449,600	1,182	1,448,417
e219	Gust generation modelling for aeronautical purposes	EPSRC	Class1b	Prof Oubay Hassan	1,620,000	1,038,590	581,409
e220	Study of interacting turbulent flames 2	EPSRC	Class1b	Dr N Swaminathan	16,919,970	0	16,919,970
e223	Numerical modelling of aorta dissection	EPSRC	Class2a	Prof. Xiaoyu Luo	300,000	0	300,000

Code	Project Title	Funding Body	Class	Principal Investigator	AUs allocated	AUs used	AUs left
e224	Electronic properties of inorganic-organic hybrid materials	EPSRC	Class2a	Prof Anthony K Cheetham	400,000	0	400,000
e225	New Ru and Ir Chromophores for Solar Cell Devices	EPSRC	Class2a	Dr Paul Elliott	300,000	20,937	279,062.30
e226	Novel Vibrational Spectroscopic Techniques	EPSRC	Class1a	Dr Andrew D Burnett	1,032,300	0	1,032,300
e227	OPL	EPSRC	Class2a	Dr Radhika R. S. Saksena	50,000	46,427	3,572
e228	Development of the potential of doped metal-oxide nanotubes	EPSRC	Class1a	Dr Gilberto Teobaldi	4,918,320	68,194	4,850,125
e229	DTC in Complex Systems Simulations	EPSRC	Class1a	Prof Jonathan W Essex	50,000,000	0	50,000,000
j01	JST	EPSRC	Class1a	Dr Andrew R Turner	71,990,708	11,588,053	60,402,654
STFC Projects							
p01	Atomic Physics for APARC	STFC	Class1a	Dr Penny Scott	10,002,701	661,014	9,341,686
NERC Projects							
n01	Global Ocean Modelling Consortium	NERC	Class1a	Dr Thomas Anderson	144,335,502.20	102,741,770	41,593,732
n02	NCAS (National Centre for Atmospheric Science)	NERC	Class1a	Dr Lois Steenman-Clark	454,832,294.20	359,090,010	95,742,283
n03	Computational Mineral Physics Consortium	NERC	Class1a	Prof John P Brodholt	397,647,014.20	314,571,563	83,075,450
n04	Shelf Seas Consortium	NERC	Class1a	Dr Roger Proctor	104,161,498.40	77,147,346	27,014,151
BBSRC Projects							
b10	SPRINTing with HECToR [dCSE]	BBSRC	Class2b	Mr Terry Sloan	1,595,120	519,054	1,076,065
b12	Flu Analysis on HECToR	BBSRC	Class1a	Mr Adrian Jackson	50,000	0.1	49,999

Code	Project Title	Funding Body	Class	Principal Investigator	AUs allocated	AUs used	AUs left
b13	Linear Scaling DFT for Biochemistry Applications	BBSRC	Class1a	Dr David Bowler	5,587,200	105,625	5,481,574
b100	Widening the BBSRC HPC User Base	BBSRC	Class1a	Dr Michael Ball	10,000,000	632,469	9,367,530
Director's Time							
d11	NAIS	DirectorsTime	Service	Prof Mark Ainsworth	10,000,001	1,061,280	8,938,720
d15	HPC-GAP	DirectorsTime	Service	Dr David Henty	2,033	1,798	234
d16	ETC	DirectorsTime	Service	Dr Lorna Smith	501,000	193,484	307,515
d19	OpenFOAM Demo	DirectorsTime	Service	Dr Alan Gray	1,950,000	1,894,829	55,171
d21	GADGET	DirectorsTime	Service	Dr Adrian Jenkins	1,000,001	18,584	981,416
d23	TEXT FP7	DirectorsTime	Service	Dr Mark Bull	1,500,000	25,298	1,474,701
d24	SBSI	DirectorsTime	Service	Dr Stephen Gilmore	2,000,000	958,105	1,041,894
d25	Code Scaling	DirectorsTime	Service	Dr Ken Rice	51,500,000	6,350,228	45,149,771
d26	Guest Training Accounts	DirectorsTime	Service	Miss Elizabeth Sim	50,000	43,207	6,792
d27	RollsRoyce	DirectorsTime	Service	Mr Paul Graham	50,000	17,079	32,920
d28	Simulations of antimicrobial peptides	DirectorsTime	Class1a	Dr Andrew R Turner	8,000,000	6,081,340	1,918,659
d29	Nu-FuSe	DirectorsTime	Service	Mr Adrian Jackson	500,000	4.	499,995
d30	PARTRAC	DirectorsTime	Service	Dr Mark Sawyer	200,000	7,597	192,403
d31	Semileptonic Decay	DirectorsTime	Service	Prof Richard Kenway	1,000,001	0	1,000,001

Code	Project Title	Funding Body	Class	Principal Investigator	AUs allocated	AUs used	AUs left
d32	APOS-EU	DirectorsTime	Service	Dr Michele Weiland	1,000,000	116,374	883,625
d33	Mark Westwood's Project	DirectorsTime	Service	Mr Mark Westwood	100,000	8,932	91,067
d34	Msc 2011-2012	DirectorsTime	Service	Dr David Henty	1,000,000	17,701	982,298
d35	PhD	DirectorsTime	Service	Dr Mark Bull	10,000	0	10,000
d36	Genome	DirectorsTime	Service	Dr Alan Gray	3,460,000	0	3,460,000
External Projects							
x01	HPC-Europa	External	Service	Dr Judy Hardy	23,886,237	11,680,469	12,205,767