

HPCx Service Report

January 2006

1 Introduction

This report covers the period from 1 January 2006 at 0800 to 1 February 2006 at 0800, a service month of 744 hours.

Overall utilisation, at 60%, was substantially down on last month's very high figure; capability use also fell substantially. This was principally the result of the closure of two projects: e03 (Taylor) and b03 (Sansom).

2 Usage

2.1 Availability

Incidents

During this month, there were 17 incidents, only one of which was at SEV 1. The following table indicates the severity levels of the incidents, where SEV 1 is defined as a *Failure* (in contractual terms). The definitions used for severity levels can be found in Appendix A.

<i>Severity</i>	<i>Number</i>
1	1
2	7
3	9
4	0

The attributions for the SEV 1 incident were as follows:

<i>SEV1</i>	<i>Incidents</i>	<i>MTBF</i>
IBM	1.0	732
Site	0.0	∞
External	0.0	∞
<i>Overall</i>	1.0	732

The following table gives more details on the Severity 1 incident:

<i>Failure</i>	<i>Site</i>	<i>IBM</i>	<i>External</i>	<i>Reason</i>
06.004	0%	100%	0%	GPFS failure

Serviceability

There was a total of 16.3 hours of scheduled downtime this month.

<i>Attribution</i>	<i>UDT</i>	<i>Serviceability</i>
IBM	1:24	99.8
Site	0:00	100.0
External	0:00	100.0
<i>Overall</i>	1:24	99.8

2.2 CPU Usage by Consortium

Main Service

<i>Consortium</i>	<i>CPU Hours (Parallel)</i>	<i>CPU Hours (Other)</i>	<i>AUs charged</i>	<i>%age of charged AUs</i>
e03	20349	31	98118	3.2%
e04	15275	41	73739	2.4%
e05	121053	14	563781	18.6%
e06	57439	1	276497	9.1%
e07	162	0	778	0.0%
e08	4651	0	22391	0.7%
e11	35782	0	172271	5.7%
e14	27352	5	131710	4.3%
e17	94	0	453	0.0%
e18	5357	1	25796	0.9%
e20	90270	189	435506	14.4%
e24	316	0	1522	0.1%
e25	1239	433	8049	0.3%
e26	0	1	5	0.0%
e31	2017	30	9855	0.3%
e32	3615	0	16498	0.5%
e33	8656	0	41673	1.4%
<i>EPSRC Total</i>	<i>393627</i>	<i>745</i>	<i>1878642</i>	<i>62.0%</i>

n01	4405	1	21215	0.7%
n02	133435	27	642547	21.2%
n03	45442	235	219908	7.3%
n04	2604	112	13073	0.4%
<i>NERC Total</i>	<i>185886</i>	<i>376</i>	<i>896743</i>	<i>29.6%</i>

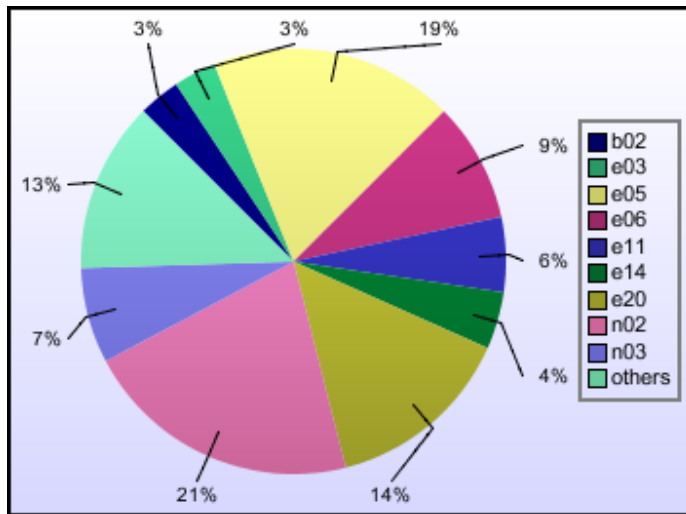
p01	2088	2	10062	0.3%
<i>PPARC Total</i>	<i>2088</i>	<i>2</i>	<i>10062</i>	<i>0.3%</i>

c01	13234	86	64130	2.1%
<i>CCLRC Total</i>	<i>13234</i>	<i>86</i>	<i>64130</i>	<i>2.1%</i>

b02	23522	0	96257	3.2%
<i>BBSRC Total</i>	<i>23522</i>	<i>0</i>	<i>96257</i>	<i>3.2%</i>

x01	845	1	4072	0.1%
<i>External Total</i>	845	1	4072	0.1%

z001	15703	40	75795	2.5%
z002	0	0	1	0.0%
z06	965	44	4859	0.2%
<i>HPCx Total</i>	16668	84	80655	2.7%



Development Service

<i>Consortium</i>	<i>CPU Hours (Parallel)</i>	<i>CPU Hours (Other)</i>	<i>AUs charged</i>	<i>%age of charged AUs</i>
n01	1979	0	9526	10.4%
n02	28	0	135	0.1%
<i>NERC Total</i>	2007	0	9661	10.6%

z002	16945	0	81580	89.4%
<i>HPCx Total</i>	16945	0	81580	89.4%

Usage under z002 (Systems and Operations) corresponds to test runs associated with the opening of the new service.

2.3 CPU Usage by Job Type

The figures for *Raw AUs* given here show the number of AUs actually supplied by the system to users' jobs. It uses the conversion rate for the AU which corresponds to the results of the Linpack benchmark running on the new platform; that is, 1 CPU hour = 3.8675 AUs.

Main service

<i>Number of Processors</i>	<i>Raw AUs</i>	<i>%age</i>	<i>Number of Jobs</i>
≤32	301913	9.9%	3113
33–64	186194	6.1%	770
65–128	980290	32.0%	535
129–256	1243852	40.6%	482
257–512	183153	6.0%	70
513–1024	165960	5.4%	22

Overall utilisation was 59.4%.

Development Service

<i>Number of processors</i>	<i>Raw AUs</i>	<i>%age</i>	<i>Number of jobs</i>
≤32	9698	10.6%	241
33–64	81416	89.2%	1774
65–128	51	0.1%	4
129–256	75	0.1%	4

Overall utilisation was 13.6%.

2.4 Slowdown and Job Wait Times

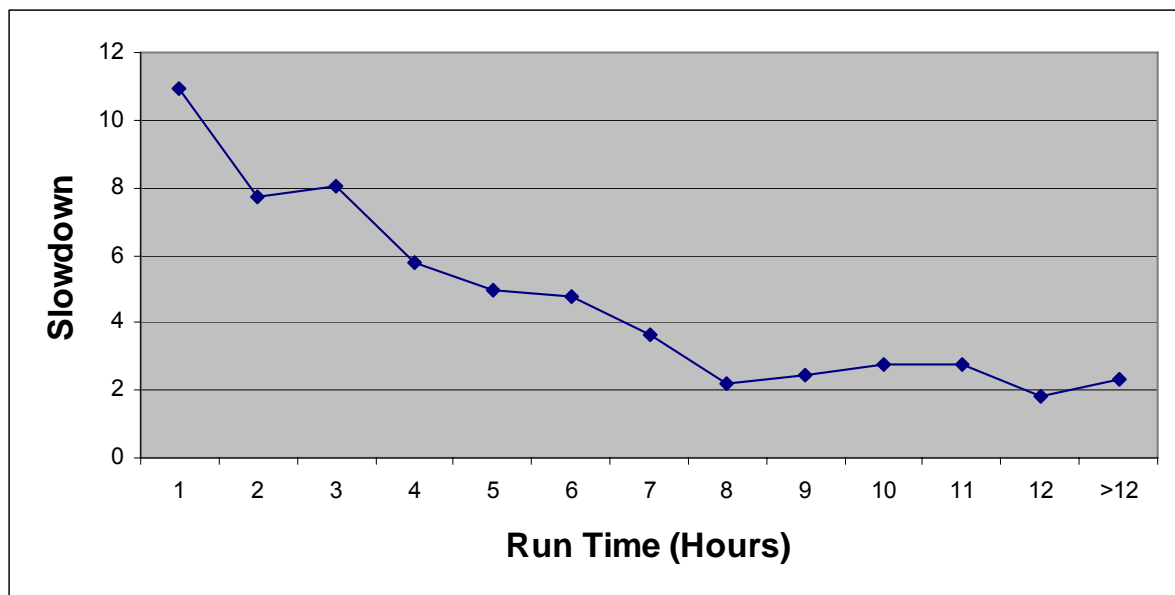
Slowdown and job wait times data will be supplied only for the main service this month.

Slowdown

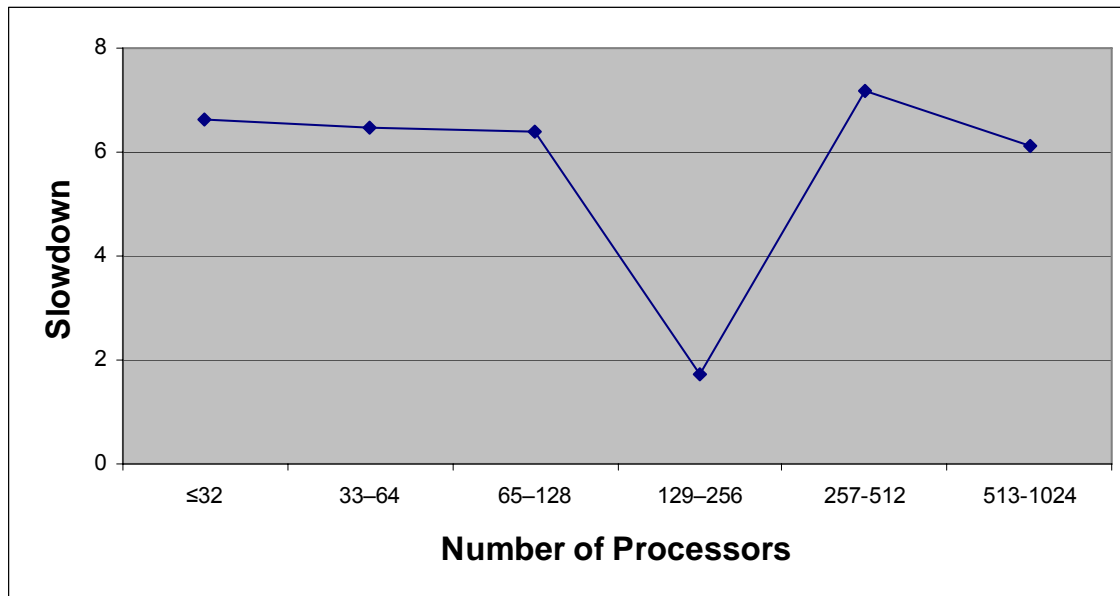
Slowdown is a widely used measure of the relative wait times of different classes of jobs. It is defined as:

$$\text{Slowdown} = (\text{job run time} + \text{job wait time}) / (\text{job run time})$$

Slowdowns of less than around 10 are usually regarded as reasonable. The graph below plots slowdown against run-time (ignoring jobs of less than 5 minutes duration). The pattern of slowdowns continues to be satisfactory.



In the graph below, we plot the slowdown figures against the number of processors used and ignoring the development jobs of less than 1 hour.

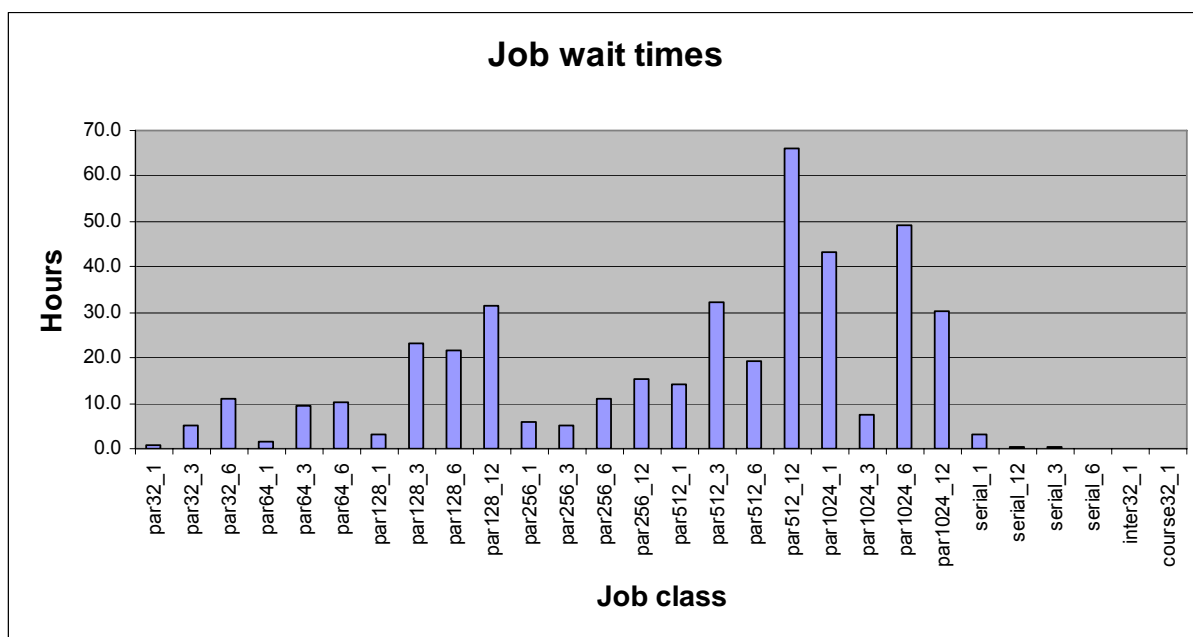


Job wait times

The following table and graph shows the average wait time (in hours) for each class of job. These are also satisfactory in general.

Job Class	Category	Maximum Number of CPUs	Maximum Job length	Average wait time	Number of Jobs
par32_1	parallel	32	1	0.7	1636
par32_3	parallel	32	3	5.2	96
par32_6	parallel	32	6	11.0	753
par64_1	parallel	64	1	1.5	180
par64_3	parallel	64	3	9.6	26
par64_6	parallel	64	6	10.4	135
par128_1	parallel	128	1	3.2	203
par128_3	parallel	128	3	23.0	16
par128_6	parallel	128	6	21.5	27
par128_12	parallel	128	12	31.5	139
par256_1	parallel	256	1	6.0	84
par256_3	parallel	256	3	4.9	12
par256_6	parallel	256	6	11.1	81
par256_12	parallel	256	12	15.3	30
par512_1	parallel	512	1	14.1	45
par512_3	parallel	512	3	32.4	29
par512_6	parallel	512	6	19.4	39

par512_12	parallel	512	12	66.1	34
par1024_1	parallel	1024	1	43.3	14
par1024_3	parallel	1024	3	7.5	1
par1024_6	parallel	1024	6	49.0	4
par1024_12	parallel	1024	12	30.3	31
serial_1	serial	1	1	3.3	875
serial_12	serial	1	3	0.3	251
serial_3	serial	1	6	0.2	26
serial_6	serial	1	9	0.0	25
inter32_1	interactive	32	1	0.0	1702
course32_1	parallel	32	1	0.0	14



2.5 Disk Occupancy

Home Space

Home space is the part of the disk space that is regularly backed up.

<i>Consortium</i>	<i>Disc Occupancy (Mb)</i>	<i>Disc Quota (Mb)</i>
b02	31,751.30	50,000
b03	4,495.20	50,000
b04	0.1	50,000
b05	16,408.60	50,000
b06	14,993.30	50,000
b08	0.1	50,000
c01	84,859.10	100,000
e01	44,018.70	48,834
e02	23,079.20	38,829
e03	51,266.30	225,012
e04	74,597.80	100,000
e05	208,534.90	445,000
e06	288,490.90	300,000
e07	7,403.60	20,000
e08	22,329.90	50,000
e10	9,910.20	10,000
e11	39,637.70	100,000
e12	8,766.20	20,000
e14	71,211.30	100,000
e15	4,053.30	50,000
e16	46.3	20,000
e17	19,507.20	50,000
e18	35,834.40	40,000
e19	43.1	40,000
e20	49,431.90	60,000
e21	95.5	50,000
e22	0.1	10,000
e23	0.1	50,000
e24	9,292.50	50,000
e25	5,325.40	50,000
e26	18,926.90	20,000
e27	3,401	20,000
e28	26,913.80	40,000
e29	328.6	30,000
e30	0.1	40,000
e31	49,838.80	50,000
e32	13,918.80	50,000

e33	121.7	50,000
n01	47,448.60	50,000
n02	92,296.90	128,000
n03	53,823.10	100,000
n04	174,795.20	299,999
n05	2	10,000
p01	33,024.60	40,000
x01	38,833.30	50,000
x02	8,746.20	20,000
z001	262,066.30	270,001
z002	42,913.80	48,001
z003	0.2	3
z004	72,106.70	100,000
z05	4,187.80	30,000
z06	49,187.20	50,000
z07	20,536.50	30,000
z09	15,366.40	50,000

Workspace

<i>Consortium</i>	<i>Disc Occupancy (Mb)</i>	<i>Disc Quota (Mb)</i>
b02	14.8	1,025
b03	59,609.20	100,000
b04	0.1	100,000
b05	6,222.70	100,000
b06	623.3	100,000
b08	0.1	50,000
c01	79,748.70	100,000
e01	1,051,068.40	1,150,000
e02	8,354.80	10,000
e03	9.8	500,000
e04	2,651,620.10	3,200,000
e05	161,492.80	487,804
e06	394,744.60	400,000
e07	51,615	99,999
e08	140.6	5,000
e10	284,222.90	300,000
e11	8,843.10	100,000
e12	726.2	100,000
e14	119,331.90	150,000
e15	18,238.40	100,000
e16	0.2	60,000
e17	815	100,000
e18	2,680	80,000
e19	168,861.60	200,000
e20	588,781.50	1,000,000

e21	1	100,000
e22	0.1	20,000
e23	0.1	100,000
e24	35,979	100,000
e25	119,250.20	150,000
e26	0.1	40,000
e27	0.3	40,000
e28	19,499.60	80,000
e29	919	8,000
e30	0.1	80,000
e31	81,030.20	100,000
e32	484.2	100,000
e33	1,162.20	100,000
n01	341,283.80	500,000
n02	1,623,586	1,989,002
n03	263.8	1,002
n04	627,293.50	750,000
n05	24,965.30	90,000
p01	998.5	1,000
x01	99,997.40	100,000
x02	0.2	20,000
z001	343,658.90	399,999
z002	290.4	770
z003	0.2	3
z004	23,742.40	25,000
z05	0.2	1,000
z06	82,930.90	100,000
z07	1.7	1
z09	22,327.80	100,000

2.6 Tape Archive

<i>Consortium</i>	<i>Usage (Tapes)</i>	<i>Quota (Tapes)</i>	<i>Files</i>	<i>Data (Gb)</i>
c01	2	2	17	17
e01	38	38	36747	3425
e03	5	5	18797	429
e04	4	14	1260	254
e14	8	10	11641	90
e26	2	2	72	11
n01	120	120	11544	11939
n02	94	170	76551	14075
n04	20	20	71265	2407
z001	2	10	6189	50
z002	4	4	5810	15
z06	1	3	833	68

Note that a tape is counted in the *Usage* column even if it is only partly occupied.

3 Support

3.1 Helpdesk

Classifications

<i>Category</i>	<i>Number</i>	<i>% of all</i>
Administrative	27	44.3
Technical	29	47.5
In-depth	5	8.2
PMR	0	0.0
TOTAL	61	100.0

The PMR category indicates in-depth queries that result in Problem Management Reports for IBM.

<i>Service Area</i>	<i>Number</i>	<i>% of all</i>
Phase 2 platform	56	91.8
Website	0	0.0
Other/general	5	8.2
TOTAL	61	100.0

Performance

<i>All non-indepth queries</i>	<i>Number</i>	<i>%</i>	<i>Target</i>
Finished within 24 Hours	46	82.1	75%
Finished within 72 Hours	55	98.2	97%
Finished after 72 Hours	1	1.8	

<i>Administrative queries</i>	<i>Number</i>	<i>%</i>	<i>Target</i>
Finished within 48 Hours	26	96.3	97%
Finished after 48 Hours	1	3.7	

Experts Handling Queries

<i>Expert</i>	<i>Admin</i>	<i>Technical</i>	<i>In-Depth</i>	<i>PMR</i>
epcc.ed.ac.uk	20	12	3	0
dl.ac.uk	1	3	1	0
Sysadm	5	14	1	0
Other people	1	0	0	0

3.2 Training

There were no training courses in January.

4 Staffing

4.1 Science Support Staffing

Daresbury Laboratory

<i>Name</i>	<i>Days</i>
Ashworth	9.8
Blake	2.1
Bush	18.0
Guest	5.3
Johnstone	10.5
Jones	2.9
Plummer	21.0
Sherwood	2.6
Sunderland	21.0
Thomas	10.5
Pickles	2.0
van Dam	2.3
Total (Days)	107.9
FTEs	6.1

EPCC

<i>Name</i>	<i>Days</i>
Simpson	12.1
Booth	16.9
Henty	5.9
Smith	12.9
Bull	3.7
Fisher	5.0
Hein	14.8
Jackson	3.0
Pringle	9.2
Reid	9.1
Stratford	0.6
Nazarova	1.1
Trew	4.3
Gray	7.8
D'Mellow	11.7
Hill	8.6

Helpdesk	1.7
Total (Days)	128.3
FTEs	7.2

Overall Levels

	<i>FTEs</i>
DL	6.1
EPCC	7.2
Total	13.3

4.2 Systems Staffing

<i>Name</i>	<i>Days</i>
Andrews	15.8
Blake	0.0
Brown	21.0
Fisher	10.0
Georgeson	15.8
Franks	15.8
Jones	0.0
Shore	15.8
BITD	21.0
Total (days)	115.0
FTEs	6.5

Note: BITD covers a range of bookings from a support department who provide approximately 1 FTE to support computer room operations, electrical and mechanical site services and networking and security. Roughly a dozen staff charge time to the project in amounts which vary from month to month. We believe that it adds no value to report these individual bookings although a full listing can be provided annually if required.

5 Summary of Performance Metrics

<i>Metric</i>	<i>TSL</i>	<i>FSL</i>	<i>Monthly Measurement</i>
Technology serviceability	80%	99.2%	99.8%
Technology MTBF (hours)	200	300	732
Number of AV FTEs	7.5	10	13.3
Number of training days per month	22.5/12	30/12	0/1
Non in-depth queries resolved within 3 days	85%	97%	98.2%
Number of A&M FTEs	3.75	5.75	6.5
A&M serviceability	80%	99.6%	100.0%

Appendix A: 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 filesystems 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

B.1 Current Projects

EPSRC Projects

<i>Code</i>	<i>Class</i>	<i>Title</i>	<i>PI</i>
e04	1	Chemreact Computing Consortium	Prof Jonathon Tennyson
e05	1	Materials Chemistry using Terascaling Computing	Prof Richard Catlow
e06	1	UK Car-Parrinello Consortium	Prof Paul Madden
e07	2	Turbulent Plasma Transport in Tokamaks	Dr Colin M Roach
e08	2	Organic Solid State	Prof Sarah Price
e10	1	Reality Grid	Prof Peter Coveney
e11	1	Bond making and breaking at surfaces	Prof Sir David A King
e14	1	Blade and Cavity Noise	Prof Neil Sandham
e15	2	CSAR/HPCx Collaboration	Dr Mike Pettipher
e16	1	Cardiac virtual tissues	Prof Arun V Holden
e17	1	Integrative Biology	Dr David Gavaghan
e18	1	DARP: Highly swept leading edge separations	Prof Michael A Leschziner
e19	1	Edinburgh Soft Matter and Statistical Physics Group	Prof Michael E Cates
e20	1	UK Applied Aerodynamics Consortium	Dr Ken Badcock
e21	1	Intrinsic Parameter Fluctuations in Decanometer MOSFETs	Prof Asen M Asenov
e22	1	Preconditioners for finite element problems	Prof David J Silvester
e23	1	Exploitation of Switched Lightpaths for e-Science Applications	Prof Peter Clarke
e24	1	DEISA - Distributed European Infrastructure for Supercomputing Applications	Dr David Henty
e25	1	Turbulent vortex motion in stratified flows	Dr Gary Coleman
e26	1	Simulation of Radioprobing	Dr Charlie Laughton
e27	1	SPICE	Prof Peter V Coveney

e28	1	Towards the Dynome	Dr Jonathan W Essex
e29	1	Free-surface-piercing circular cylinders	Dr Eldad Avital
e30	1	Metal/Oxide Interfaces at the Atomic Level	Dr Nora de Leeuw
e31	1	Lateral Straining of Wall-Bounded Turbulence	Dr Gary N Coleman
e32	1	Rapid Prototyping of Usable Grid Middleware	Prof Peter V Coveney
e33	1	Engineering Functional Coatings	Prof Roger Smith
z09		HECToR Benchmarking	Dr Edward Smyth

PPARC Projects

<i>Code</i>	<i>Class</i>	<i>Title</i>	<i>PI</i>
p01	1	Atomic Physics and Astrophysics	Prof Alan Hibbert

NERC Projects

<i>Code</i>	<i>Class</i>	<i>Title</i>	<i>PI</i>
n01	1	Large-Scale Long-Term Ocean Circulation	Dr David Webb
n02	1	NCAS	Prof Alan J Thorpe
n03	1	Computational Mineral Physics Consortium	Dr John Brodholt
n04	1	Shelf Seas Consortium	Dr Roger Proctor
n05	2	Non-linear Wave-particle Instabilities in Plasmas	Dr Mervyn Freeman

BBSRC Projects

<i>Code</i>	<i>Class</i>	<i>Title</i>	<i>PI</i>
b02	1	Modelling enzyme catalysis	Dr Adrian J Mulholland
b08	1	IntBioSim	Prof M S Sansom

CCLRC Projects

<i>Code</i>	<i>Class</i>	<i>Title</i>	<i>PI</i>
c01	1	Daresbury Laboratory Facilities Agreement Consortium	Dr Richard J Blake

Externally-funded Projects

<i>Code</i>	<i>Title</i>	<i>PI</i>
x01	HPC-Europa	Dr J-C Desplat

HPCx Projects

<i>Code</i>	<i>Title</i>	<i>PI</i>
z001	HPCx Support	Dr Alan Simpson
z002	Systems and Operations	Mr Mike Brown
z003	Test Project	Dr Denis Nicole
z004	HPCx Training	Dr David Henty
z05	Outreach Projects	Dr Richard Blake
z06	Application Porting	Dr David Henty
z07	Package Installation	Dr Mike Ashworth

B.2 Former Projects

Former Projects

<i>Code</i>	<i>Class</i>	<i>Title</i>	<i>PI</i>
b01	2	Quantum Chemistry Studies of the Rusticyanin Protein Crystal	Prof Samar Hasnain
b03	1	Towards a virtual outer membrane	Prof Mark S Sansom
b04	1	Life sciences software development	Dr Jo L Dicks
b05	1	Virtual forced evolution of catalytic transition metal complexes	Dr Marcus Durrant
b06	2	Biomolecular computational chemistry	Prof Jonathan D Hirst
e02	1	Ab-initio simulation of covalently bonded materials	Dr Patrick Briddon
e03	1	Multi-photon, electron collisions and BEC HPC consortium	Prof Ken Taylor
e01	1	UK Turbulence Consortium	Prof Neil Sandham
e09	2	Molecular Properties and their Geometry	Prof Peter Taylor
e12	1	Parallel programs for the simulation of complex fluids	Dr Mark R Wilson

e13	1	TeraGyroid project	Dr Richard J Blake
x02		OHM Ltd	Dr Lucy MacGregor