HPCx Service Report
July 2005

1 Introduction

This report covers the period from 1 July 2005 at 0800 to 1 August 2005 at 0800, a service month of 744 hours.

Although utilisation fell back to around 65% – presumably as a result of the holiday season – capability usage, at more than 35%, was the highest for a year.

1.1 Availability

Incidents

During this month, there were 10 incidents, three of which were 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.

Severity	*Number*
1	3
2	2
3	5
4	0

The attributions for the SEV 1 incidents were as follows:

SEV1	*Incidents*	*MTBF*
IBM	1.0	732
Site	1.0	732
External	1.0	732
Overall	3.0	244

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

Failure	*Site*	*IBM*	*External*	*Reason*
05.100	0%	0%	100%	External network failure
05.106	50%	50%	0%	Login node crashed/reloaded (twice)
05.107	50%	50%	0%	Login node crashed/reloaded (twice)

Failures 5.106 and 5.107 each represent a pair of events: at 19:16 and 22:26 on 12 August, and at 10:25 and 11:10 the next day.

Serviceability

There was a total of 10.1 hours of scheduled downtime this month.

Attribution	*UDT*	*Serviceability*
IBM	2:16	99.7
Site	2:16	99.7
External	6:25	99.1
Overall	10:57	98.5

1.2 CPU Usage by Consortium

The PIs and titles for the various consortia are listed in Appendix B.

Consortium	*CPU Hours (Parallel)*	*CPU Hours (Other)*	*AUs charged*	*%age*
e02	43911	301	170988	5.8%
e03	47	36	320	0.0%
e04	68909	6	266529	9.1%
e05	93841	215	363762	12.4%
e06	183006	16	707838	24.1%
e07	227	0	878	0.0%
e08	11443	0	44257	1.5%
e10	4154	8	16099	0.5%
e11	4578	0	17707	0.6%
e14	9320	68	36305	1.2%
e15	1	0	4	0.0%
e17	366	0	1415	0.0%
e18	5971	0	23093	0.8%
e19	8069	0	31208	1.1%
e20	12186	225	47998	1.6%
e24	715	1	2769	0.1%
e25	0	5	18	0.0%

e26	0	0	1	0.0%
e27	96	42	536	0.0%
e28	3	0	10	0.0%
e29	1134	2	4395	0.1%
e31	1	0	2	0.0%
z09	5335	0	20631	0.7%
EPSRC Total	453313	925	1756765	59.8%

n01	123274	26	476859	16.2%
n02	84808	19	328069	11.2%
n03	11074	0	42829	1.5%
n04	30552	2	118167	4.0%
NERC Total	249707	47	965924	32.9%

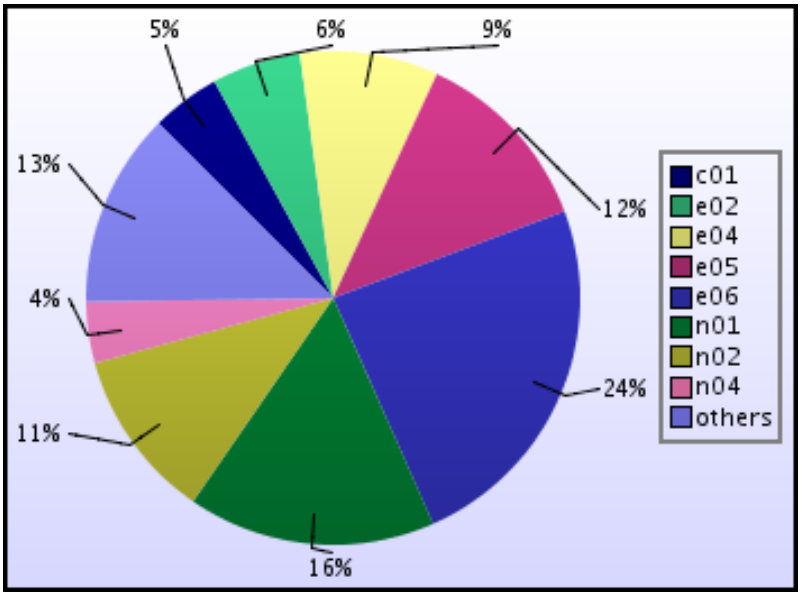
p01	1014	20	3999	0.1%
PPARC Total	1014	20	3999	0.1%

c01	34208	152	132889	4.5%
CCLRC Total	34208	152	132889	4.5%

b02	4	0	17	0.0%
b03	3120	0	12067	0.4%
BBSRC Total	3124	0	12083	0.4%

x01	1827	0	7064	0.2%
External Total	1827	0	7064	0.2%

z001	14845	42	57574	2.0%
z002	214	0	828	0.0%
z004	576	7	2252	0.1%
z06	0	1	4	0.0%
HPCx Total	15634	50	60658	2.1%



1.3 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 Phase 2 platform; that is, 1 CPU hour = 3.8675 AUs.

Number of Processors	*Raw AUs*	*%age*	*Number of Jobs*
≤32	362510	12.4%	5163
33–64	162311	5.5%	599
65–128	1073724	36.6%	753
129–256	305990	10.4%	329
257–512	750877	25.6%	161
513–1024	279353	9.5%	42
>1024	0	0.0%	0

The system is divided into three regions.

Development Region (9 frames, jobs using ≤64 CPUs): a total of 524821 raw AUs were used; that is 63.3% of the total available in this region

Production Region (40 frames, jobs using >64 CPUs): a total of 2409944 raw AUs were used; that is 65.4% of the total available in this region

The remaining frame is reserved for interactive parallel jobs.

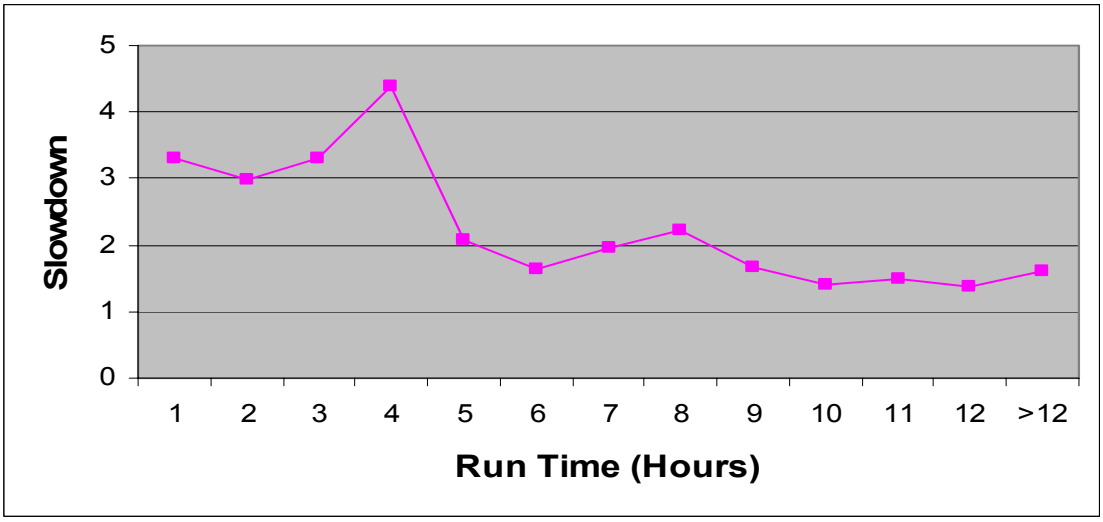
1.4 Slowdown and Job Wait Times

Slowdown

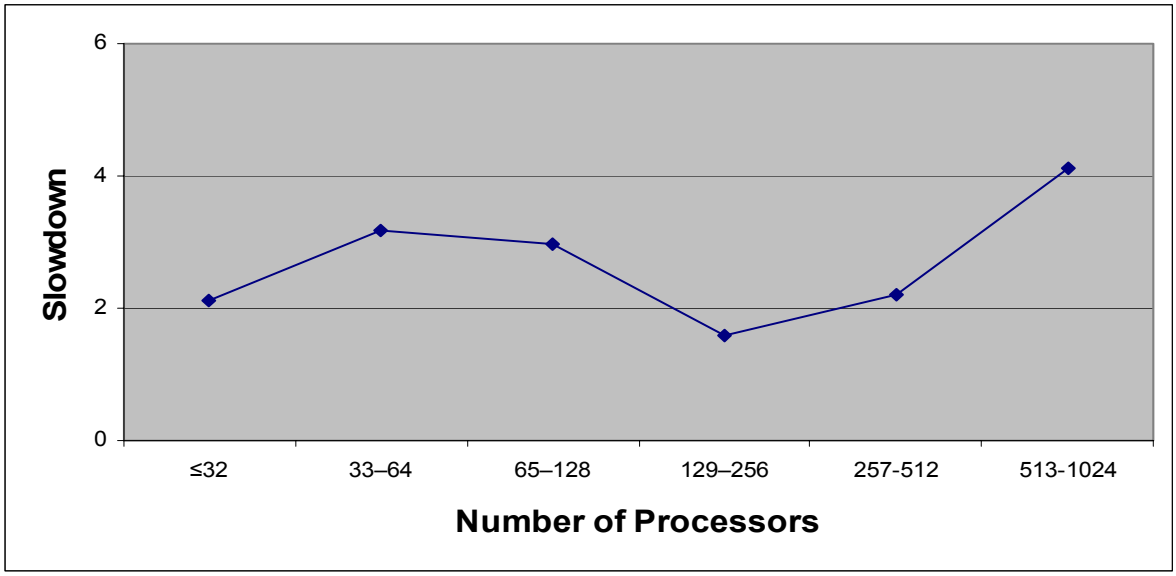
Slowdown is a widely used measure of the relative wait times of different classes of jobs. It is defined as:

Slowdown = (job run time + job wait time) / (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). This month's figures show a very good balance between queues and job numbers.



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.

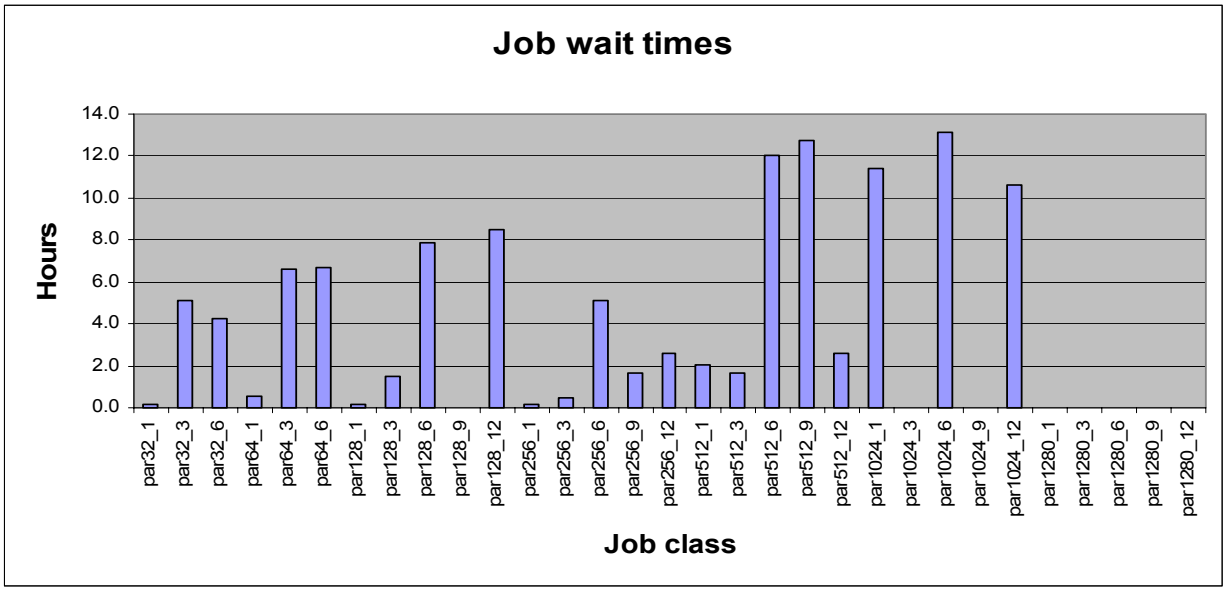


Job wait times

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

Job Class	*Category*	*Maximum Number of CPUs*	*Maximum Job length*	*Average wait time*	*Number of Jobs*
par32_1	parallel	32	1	0.1	4613
par32_3	parallel	32	3	5.1	24
par32_6	parallel	32	6	4.2	526
par64_1	parallel	64	1	0.6	391
par64_3	parallel	64	3	6.6	25
par64_6	parallel	64	6	6.7	183
par128_1	parallel	128	1	0.2	259
par128_3	parallel	128	3	1.5	68
par128_6	parallel	128	6	7.8	109
par128_9	parallel	128	9	0.0	0
par128_12	parallel	128	12	8.5	317
par256_1	parallel	256	1	0.2	213
par256_3	parallel	256	3	0.5	14
par256_6	parallel	256	6	5.1	19
par256_9	parallel	256	9	1.7	11
par256_12	parallel	256	12	2.6	72
par512_1	parallel	512	1	2.0	82
par512_3	parallel	512	3	1.6	7
par512_6	parallel	512	6	12.0	22
par512_9	parallel	512	9	12.7	2
par512_12	parallel	512	12	2.6	48
par1024_1	parallel	1024	1	11.4	25

par1024_3	parallel	1024	3	0.0	0
par1024_6	parallel	1024	6	13.2	7
par1024_9	parallel	1024	9	0.0	0
par1024_12	parallel	1024	12	10.6	10
par1280_1	parallel	1280	1	0.0	0
par1280_3	parallel	1280	3	0.0	0
par1280_6	parallel	1280	6	0.0	0
par1280_9	parallel	1280	9	0.0	0
par1280_12	parallel	1280	12	0.0	0
serial_1	serial	1	1	0.1	716
serial_12	serial	1	3	0.0	8
serial_3	serial	1	6	0.2	73
serial_6	serial	1	9	0.7	80
serial_9	serial	1	12	0.0	4
inter32_1	interactive	32	1	0.0	2801
course32_1	parallel	32	1	0.0	49



1.5 Disk Occupancy

Home Space

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

Consortium	*Disc Occupancy (Kb)*	*Disc Quota (Kb)*
b02	12827136	51200000
b03	4224	51200000
b04	64	51200000
b05	16802368	51200000
b06	15353152	51200000
c01	81202816	102400000
e01	45068608	50006016
e02	22720768	39760896
e03	146659872	230412288
e04	85788736	102400000
e05	176618016	359424000
e06	230728320	307200000
e07	6735392	20480000
e08	16783904	20480000
e10	9717440	10240000
e11	70292832	102400000
e12	8976640	20480000
e14	65857504	102400000
e15	3903584	51200000
e16	47392	20480000
e17	4752224	51200000
e18	29107072	40960000
e19	10144	40960000
e20	41801248	61440000
e21	97792	51200000
e22	96	10240000
e23	96	51200000
e24	523904	51200000
e25	18976	51200000
e26	14088160	20480000
e27	1440	20480000
e28	96	40960000
e29	4692704	30720000
e30	64	40960000
e31	758144	51200000
n01	37274336	51200000
n02	94232448	110592000
n03	51196352	102400000
n04	132963136	307198976

n05	2080	10240000
p01	34096896	40960000
x01	28443072	51200000
x02	8956000	20480000
z001	233356320	235521024
z002	42518720	49153024
z003	256	3072
z004	51361056	102400000
z05	4288160	30720000
z06	50543200	51200000
z07	10639680	30720000
z09	1823200	51200000

Workspace

Consortium	*Disc Occupancy (Kb)*	*Disc Quota (Kb)*
b02	15104	1049600
b03	8643904	102400000
b04	64	102400000
b05	6372000	102400000
b06	638272	102400000
c01	61505152	102400000
e01	1118726496	1177600000
e02	8291200	10240000
e03	10016	512000000
e04	1510678016	2252800000
e05	131199808	206849024
e06	223752576	409600000
e07	52853760	102398976
e08	116096	1024000
e10	268941696	307200000
e11	192	102400000
e12	743584	102400000
e14	74058400	102400000
e15	18141920	102400000
e16	192	61440000
e17	480	102400000
e18	160	81920000
e19	172930304	204800000
e20	459587808	1024000000
e21	1024	102400000
e22	96	20480000
e23	96	102400000
e24	72923776	102400000
e25	1632224	102400000
e26	128	40960000
e27	192	40960000

e28	96	81920000
e29	128	8192000
e30	64	81920000
e31	128	102400000
n01	194545024	512000000
n02	1044091008	1504257024
n03	51680	1026048
n04	562922560	768000000
n05	25564480	92160000
p01	1022464	1024000
x01	79747744	102400000
x02	128	20480000
z001	196203328	409598976
z002	296448	788480
z003	192	3072
z004	24922176	25600000
z05	192	1024000
z06	61911456	102400000
z07	1600	1024
z09	27913632	102400000

1.6 Tape Archive

Consortium	*Usage (Tapes)*	*Quota (Tapes)*	*Files*	*Data (Gb)*
c01	2	2	8	16
e01	38	38	36,707	3432
e03	5	5	18,797	429
e04	4	14	1,260	254
e26	2	2	72	11
n01	49	70	1,976	4604
n02	48	50	71,708	6095
n04	18	20	50,895	1857
z001	2	2	4,982	32
z002	3	4	1,619	11
z06	1	3	833	68

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

2 Support

2.1 Helpdesk

Classifications

Category	*Number*	*% of all*
Administrative	92	62.2
Technical	51	34.5
In-depth	5	3.4
PMR	0	0.0
TOTAL	148	100.0

The PMR category indicates in-depth queries that result in Problem Management Reports for IBM. The large number of Administrative queries this month includes 52 relating to registrations for courses.

Service Area	*Number*	*% of all*
Phase 2 platform	118	79.7
Website	2	1.4
Other/general	28	18.9
TOTAL	148	100.0

Performance

All non-indepth queries	*Number*	*%*	*Target*
Finished within 24 Hours	123	86.0	75%
Finished within 72 Hours	142	99.3	97%
Finished after 72 Hours	1	0.7	

Administrative queries	*Number*	*%*	*Target*
Finished within 48 Hours	91	98.9	97%
Finished after 48 Hours	1	1.1	

Experts Handling Queries

Expert	*Admin*	*Technical*	*In-Depth*	*PMR*
epcc.ed.ac.uk	78	24	4	0
dl.ac.uk	0	9	0	0
Sysadm	13	18	1	0
Other people	1	0	0	0

2.2 Training

Title of Course	*Start Date*	*Length (Days)*	*Place days*	*HPCx User Days*	*HPCx Staff Days*
Using the HPCx Service, Leeds University	26-Jul	1	24	18	0
Message Passing Programming, Leeds University	27-Jul	3	72	72	0

3 Staffing

3.1 Science Support Staffing

Daresbury Laboratory

Name	*Days*
Ashworth	9.2
Blake	1.9
Bush	21.0
Guest	3.3
Johnstone	7.5
Jones	3.0
Plummer	21.0
Sherwood	0.9
Sunderland	21.0
Thomas	10.5
Pickles	1.4
van Dam	2.6
Total (Days)	103.3
FTEs	5.8

EPCC

Name	*Days*
Simpson	16.5
Booth	11.7
Henty	12.3
Smith	9.3
Bull	2.3
Fisher	9.0
Hein	8.4
Jackson, Adrian	4.9
Pringle	4.8
Reid	13.1
Holden	11.3
Kartsaklis	11.9
Trew	5.3
Gray	7.0
D'Mellow	19.2
Helpdesk	6.3
Total (Days)	153.2
FTEs	8.6

Overall Levels

	FTEs
DL	5.8
EPCC	8.6
Total	14.4

3.2 Systems Staffing

Name	*Days*
Andrews	11.3
Blake	0.0
Brown	12.0
Fisher	8.0
Georgeson	8.3
Franks	15.8
Jones	0.0
Shore	15.8
BITD	21.0
Total (days)	92.0
FTEs	5.2

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.

4 Summary of Performance Metrics

Metric	*TSL*	*FSL*	*Monthly Measurement*
Technology serviceability	80%	99.2%	99.7%
Technology MTBF (hours)	200	300	732
Number of AV FTEs	7.5	10	14.4
Number of training days per month	22.5/12	30/12	13/7
Non in-depth queries resolved within 3 days	85%	97%	99.3%
Number of A&M FTEs	3.75	5.75	5.2
A&M serviceability	80%	99.6%	99.7%

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

Code	*Class*	*Title*	*PI*
e01	1	UK Turbulence Consortium	Prof Neil Sandham
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
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
e12	1	Parallel programs for the simulation of complex fluids	Dr Mark R Wilson
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 Decananometer 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
e27	1	SPICE	Prof Peter V Coveney
z09		HECToR Benchmarking	Dr Edward Smyth

PPARC Projects

Code	*Class*	*Title*	*PI*
p01	1	Atomic Physics and Astrophysics	Prof Alan Hibbert

NERC Projects

Code	*Class*	*Title*	*PI*
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

Code	*Class*	*Title*	*PI*
b02	1	Modelling enzyme catalysis	Dr Adrian J Mulholland
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

CCLRC Projects

Code	*Class*	*Title*	*PI*
c01	1	Daresbury Laboratory Facilities Agreement Consortium	Dr Richard J Blake

Externally-funded Projects

Code	*Title*	*PI*
x01	HPC-Europa	Dr J-C Desplat
x02	OHM Ltd	Mr Mark Westwood

HPCx Projects

Code	*Title*	*PI*
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

Code	*Class*	*Title*	*PI*
b01	2	Quantum Chemistry Studies of the Rusticyanin Protein Crystal	Prof Samar Hasnain
e09	2	Molecular Properties and their Geometry	Prof Peter Taylor
e13	1	TeraGyroid project	Dr Richard J Blake