HPCx Service Report
June 2005

1 Introduction

This report covers the period from 1 June 2005 at 0800 to 1 July 2005 at 0800, a service month of 720 hours.

Overall utilisation this month exceeded 81%, the highest value for more than a year. We delivered more than 3.5 million AUs to users, the highest value so far. Usage by NERC users made up more than 30% of this.

1.1 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.

Severity	*Number*
1	1
2	2
3	14
4	0

The attributions for the SEV 1 incident were as follows:

SEV1	*Incidents*	*MTBF*
IBM	0.0	∞
Site	0.0	∞
External	1.0	732
Overall	1.0	732

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

Failure	*Site*	*IBM*	*External*	*Reason*
05.091	0%	0%	100%	External network failure

Serviceability

There was a total of 9.4 hours of scheduled downtime this month.

Attribution	*UDT*	*Serviceability*
IBM	0:00	100.0
Site	0:00	100.0
External	34:14	95.2
Overall	34:14	95.2

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	22989	203	89694	2.5%
e03	39	1	154	0.0%
e04	117316	140	454260	12.7%
e05	223786	418	866897	24.3%
e06	182587	459	696616	19.5%
e07	32	0	125	0.0%
e08	2453	2	9495	0.3%
e11	1603	0	6201	0.2%
e14	1463	1129	10025	0.3%
e17	305	0	1179	0.0%
e18	1204	0	4657	0.1%
e19	5527	0	21376	0.6%
e20	28674	0	110898	3.1%
e21	453	3	1761	0.0%
e24	0	0	0	0.0%
e25	0	2	7	0.0%
e29	88	8	369	0.0%
z09	18	0	70	0.0%
EPSRC Total	588537	2364	2273784	63.8%

n01	83258	6	322025	9.0%
n02	75371	14	291549	8.2%
n03	85776	11	331780	9.3%
n04	42780	23	165542	4.6%
NERC Total	287185	54	1110896	31.2%

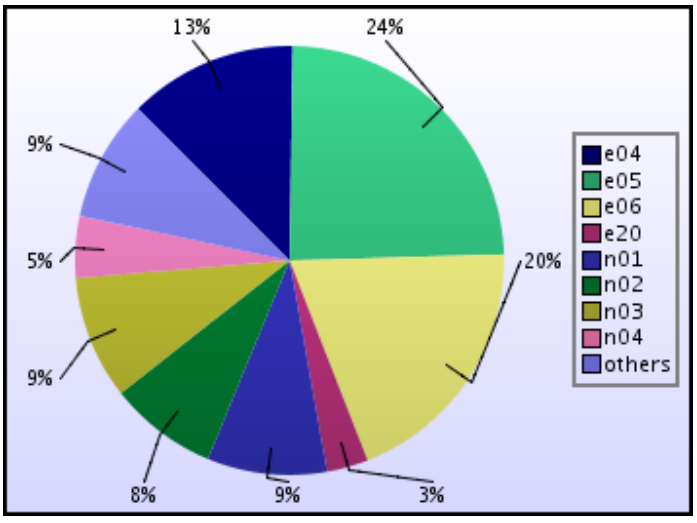
p01	9026	84	35234	1.0%
PPARC Total	9026	84	35234	1.0%

c01	23658	328	92764	2.6%
CCLRC Total	23658	328	92764	2.6%

b03	1429	1	5530	0.2%
b05	808	0	3124	0.1%
BBSRC Total	2236	1	8653	0.2%

x01	4614	15	17900	0.5%
External Total	4614	15	17900	0.5%

z001	6694	96	26260	0.7%
z002	3	0	13	0.0%
z004	179	2	698	0.0%
z06	0	0	0	0.0%
HPCx Total	6877	97	26972	0.8%



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 new platform; that is, 1 CPU hour = 3.8675 AUs.

Number of Processors	*Raw AUs*	*%age*	*Number of Jobs*
≤32	451496	12.7%	4001
33–64	256492	7.2%	513
65–128	1222071	34.3%	848
129–256	968760	27.2%	361
257–512	627947	17.6%	99
513–1024	39102	1.1%	32
>1024	477	0.0%	5

The system is divided into three regions.

Development Region (9 frames, jobs using ≤64 CPUs): a total of 707988 raw AUs were used; that is 88.3% of the total available in this region

Production Region (40 frames, jobs using >64 CPUs): a total of 2858357 raw AUs were used; that is 80.2% of the total available in this region

The remaining frame is reserved for interactive parallel jobs.

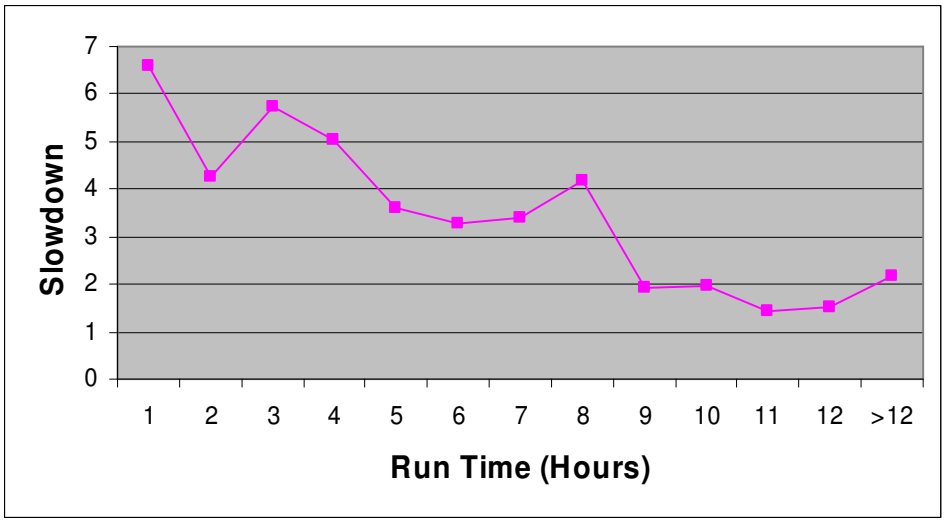
1.4 Slowdown and Job Wait Times

Slowdown

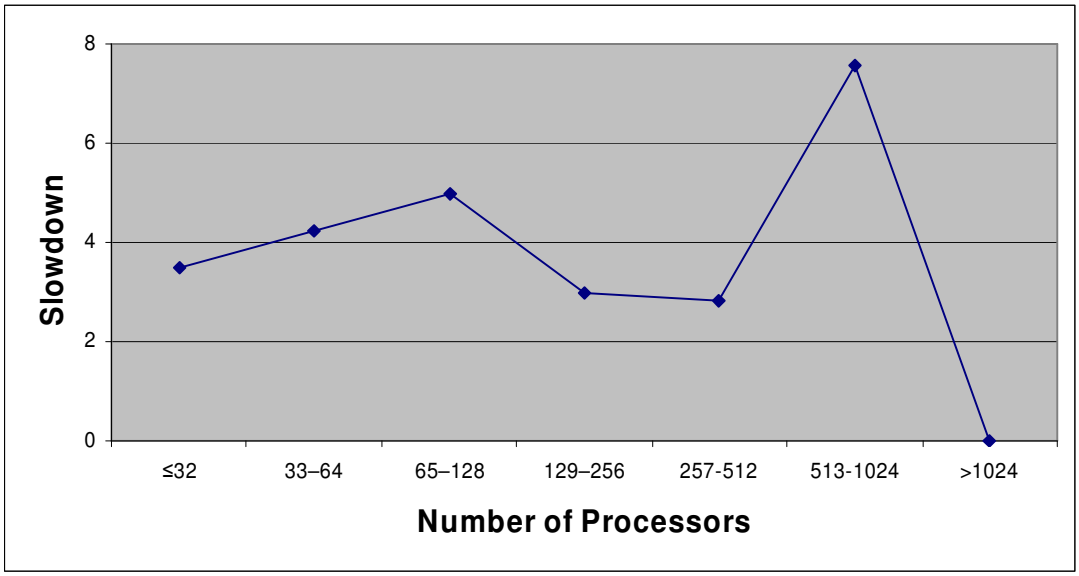
Slowdown is a widely used measure of the relative wait times of different classes of jobs. It is defined as:

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). Despite the extremely high utilisation 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.

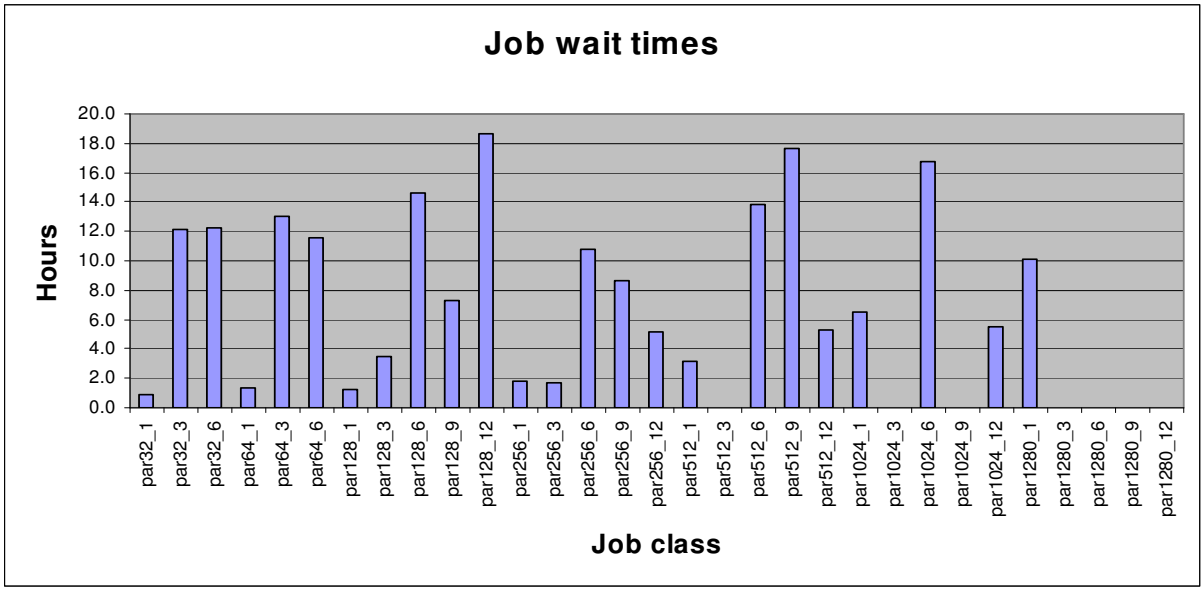


Job wait times

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	0.9	3248
par32_3	parallel	32	3	12.1	55
par32_6	parallel	32	6	12.2	698
par64_1	parallel	64	1	1.4	249
par64_3	parallel	64	3	13.0	27
par64_6	parallel	64	6	11.6	237
par128_1	parallel	128	1	1.3	235
par128_3	parallel	128	3	3.5	118
par128_6	parallel	128	6	14.6	163
par128_9	parallel	128	9	7.3	23
par128_12	parallel	128	12	18.7	309
par256_1	parallel	256	1	1.8	104
par256_3	parallel	256	3	1.7	43
par256_6	parallel	256	6	10.8	29
par256_9	parallel	256	9	8.7	5
par256_12	parallel	256	12	5.2	180
par512_1	parallel	512	1	3.2	51
par512_3	parallel	512	3	0.0	1
par512_6	parallel	512	6	13.8	15
par512_9	parallel	512	9	17.6	1
par512_12	parallel	512	12	5.2	31
par1024_1	parallel	1024	1	6.5	27
par1024_3	parallel	1024	3	0.0	0

par1024_6	parallel	1024	6	16.8	3
par1024_9	parallel	1024	9	0.0	0
par1024_12	parallel	1024	12	5.5	2
par1280_1	parallel	1280	1	10.1	5
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	443
serial_12	serial	1	3	0.0	39
serial_3	serial	1	6	0.0	17
serial_6	serial	1	9	0.4	18
serial_9	serial	1	12	0.2	36
inter32_1	interactive	32	1	0.0	3793
course32_1	parallel	32	1	0.0	0



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	12,778,112	51,200,000
b03	4,192	51,200,000
b04	64	51,200,000
b05	16,790,400	51,200,000
b06	15,353,152	51,200,000
c01	89,369,600	102,400,000
e01	44,992,128	50,006,016
e02	22,393,344	39,760,896
e03	152,130,944	230,412,288
e04	66,982,624	102,400,000
e05	183,109,312	359,424,000
e06	235,634,528	307,200,000
e07	5,813,600	20,480,000
e08	15,094,912	20,480,000
e10	8,426,368	10,240,000
e11	66,444,896	102,400,000
e12	8,976,640	20,480,000
e14	15,696,128	102,400,000
e15	3,260,576	51,200,000
e16	47,392	20,480,000
e17	3,498,016	51,200,000
e18	33,098,304	40,960,000
e19	160	40,960,000
e20	40,500,160	61,440,000
e21	97,792	51,200,000
e22	96	10,240,000
e23	96	51,200,000
e24	523,808	51,200,000
e25	142,272	51,200,000
e26	14,048,288	20,480,000
e27	96	20,480,000
e28	96	40,960,000
e29	4,556,640	30,720,000
e30	64	40,960,000
n01	37,113,888	51,200,000
n02	94,009,696	110,592,000
n03	47,969,856	102,400,000
n04	141,450,592	307,198,976
n05	2,080	10,240,000

p01	38,001,312	40,960,000
x01	27,565,216	51,200,000
x02	7,644,928	20,480,000
z001	227,150,464	235,521,024
z002	42,504,928	49,153,024
z003	256	3,072
z004	73,793,696	102,400,000
z05	4,288,160	30,720,000
z06	49,490,496	51,200,000
z07	9,482,720	10,240,000
z09	878,208	51,200,000

Workspace

Consortium	*Disc Occupancy (Kb)*	*Disc Quota (Kb)*
b02	15,104	1,049,600
b03	6,306,208	102,400,000
b04	64	102,400,000
b05	6,372,000	102,400,000
b06	638,272	102,400,000
c01	62,850,752	102,400,000
e01	1,103,625,248	1,177,600,000
e02	8,274,976	10,240,000
e03	10,016	512,000,000
e04	993,123,936	2,252,800,000
e05	108,529,600	206,849,024
e06	215,263,648	409,600,000
e07	47,750,176	102,398,976
e08	116,096	1,024,000
e10	276,647,072	307,200,000
e11	192	102,400,000
e12	743,584	102,400,000
e14	88,693,536	102,400,000
e15	18,141,856	102,400,000
e16	192	61,440,000
e17	448	102,400,000
e18	160	81,920,000
e19	172,685,152	204,800,000
e20	402,171,744	1,024,000,000
e21	1,024	102,400,000
e22	96	20,480,000
e23	96	102,400,000
e24	49,734,624	102,400,000
e25	777,024	102,400,000
e26	128	40,960,000
e27	96	40,960,000
e28	96	81,920,000

e29	128	8,192,000
e30	64	81,920,000
n01	232,973,696	512,000,000
n02	1,106,626,304	1,248,257,024
n03	31,968	1,026,048
n04	584,925,024	768,000,000
n05	25,564,480	92,160,000
p01	1,022,464	1,024,000
x01	80,848,000	102,400,000
x02	128	20,480,000
z001	196,368,576	307,198,976
z002	296,448	788,480
z003	192	3,072
z004	14,472,320	25,600,000
z05	192	1,024,000
z06	59,637,920	102,400,000
z07	1,472	1,024
z09	9,540,544	102,400,000

1.6 Tape Archive

Consortium	*Usage (Tapes)*	*Quota (Tapes)*	*Files*	*Data (Gb)*
c01	2	2	8	16
e01	38	38	36,694	3,421
e03	5	5	18,797	429
e04	4	14	1,260	254
e26	2	2	72	11
n01	36	50	1,362	3,215
n02	36	50	70,855	5,049
n04	12	20	37,973	1,479
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	27	48.2
Technical	27	48.2
In-depth	2	3.6
PMR	0	0.0
TOTAL	56	100.0

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

Service Area	*Number*	*% of all*
Phase 2 platform	43	76.8
Website	3	5.4
Other/general	10	17.9
TOTAL	56	100.0

Performance

All non-indepth queries	*Number*	*%*	*Target*
Finished within 24 Hours	44	81.5	75%
Finished within 72 Hours	52	96.3	97%
Finished after 72 Hours	2	3.7	

Administrative queries	*Number*	*%*	*Target*
Finished within 48 Hours	26	96.3	97%
Finished after 48 Hours	1	3.7	

Experts Handling Queries

Expert	*Admin*	*Technical*	*In-Depth*	*PMR*
epcc.ed.ac.uk	21	14	1	0
dl.ac.uk	2	4	1	0
Sysadm	4	9	0	0
Other people	0	0	0	0

2.2 Training

No training courses were run in June. Two courses – a total of four days – are planned for July.

3 Staffing

3.1 Science Support Staffing

Daresbury Laboratory

Name	*Days*
Ashworth	10.9
Blake	2.2
Bush	22.0
Guest	5.5
Johnstone	9.3
Jones	4.4
Plummer	18.0
Sherwood	2.6
Sunderland	19.0
Thomas	11.0
Pickles	2.1
van Dam	2.8
Total (Days)	109.8
FTEs	6.2

EPCC

Name	*Days*
Simpson	18.5
Booth	12.5
Henty	10.8
Smith	17.7
Bull	4.8
Fisher	6.5
Hein	11.5
Jackson, Adrian	9.1
Pringle	3.7
Reid	14.5
Holden	14.7
Kartsaklis	14.7
Nazarova	19.7
Trew	12.0
Gray	5.4
D'Mellow	26.9
Total (Days)	202.9
FTEs	11.4

Overall Levels

	FTEs
DL	6.2
EPCC	11.4
Total	17.6

3.2 Systems Staffing

Name	*Days*
Andrews	16.5
Blake	0.0
Brown	20.0
Fisher	7.5
Georgeson	16.5
Franks	14.3
Jones	0.0
Shore	16.5
BITD	22.0
Total (days)	113.3
FTEs	6.4

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%	100.0%
Technology MTBF (hours)	200	300	∞
Number of AV FTEs	7.5	10	17.6
Number of training days per month	22.5/12	30/12	9/6
Non in-depth queries resolved within 3 days	85%	97%	96.3%
Number of A&M FTEs	3.75	5.75	6.4
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

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
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