

HPCx Service Report

January 2007

1 Introduction

This report covers the period from 0800 on 1 January 2007 to 0800 on 1 February 2007. This was a service month of 744 hours.

Overall usage fell back a little but was still more than 72%. Usage of the development service was nearly 82%.

2 Usage

2.1 Availability

Incidents

During this month, there were 8 incidents, one of which was at SEV1. 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	3
3	4
4	0

The MTBF figures for this month were as follows:

<i>SEV1</i>	<i>Incidents</i>	<i>MTBF</i>
IBM	0.0	∞
Site	0.0	∞
External	1.0	720
<i>Overall</i>	1.0	720

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>
07.005	0%	0%	100%	Network failure at Manchester

Serviceability

Scheduled downtime for this month was 11.3 hours.

<i>Attribution</i>	<i>UDT</i>	<i>Serviceability</i>
IBM	0:00	100.0
Site	0:00	100.0
External	0:23	99.95
<i>Overall</i>	0:23	99.9

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>
e01	77450	595	374716	6.1%
e03	38	0	182	0.0%
e05	124382	1812	607554	9.8%
e06	95902	64	462025	7.5%
e08	74990	0	361033	5.8%
e10	0	3	12	0.0%
e11	5327	0	25644	0.4%
e14	35479	2	170821	2.8%
e17	5992	0	28851	0.5%
e18	368	0	1772	0.0%
e19	58	0	278	0.0%
e20	0	1	5	0.0%
e21	3945	0	18994	0.3%
e23	5093	0	24523	0.4%
e24	1	1	11	0.0%
e25	0	1	7	0.0%
e26	104	0	499	0.0%
e27	5319	0	25606	0.4%
e31	435	0	2094	0.0%
e32	3114	0	14250	0.2%
e33	5962	0	28703	0.5%
e35	21937	35	105784	1.7%
e36	922	0	4426	0.1%
e37	261623	62	1259868	20.4%
e39	6619	6	31897	0.5%
e42	80268	5	386471	6.3%
e45	5950	0	28645	0.5%
e46	562	0	2707	0.0%
e48	0	0	1	0.0%
e49	1495	23	7308	0.1%
e50	9161	2	44116	0.7%
e51	0	0	0	0.0%
e53	0	32	155	0.0%
e54	1536	0	7396	0.1%
<i>EPSRC Total</i>	834030	2646	4026355	65.2%

n01	82128	24	395520	6.4%
n02	181731	18	875024	14.2%
n03	71438	877	348041	5.6%
n04	10040	1	48340	0.8%
<i>NERC Total</i>	345338	920	1666924	27.0%

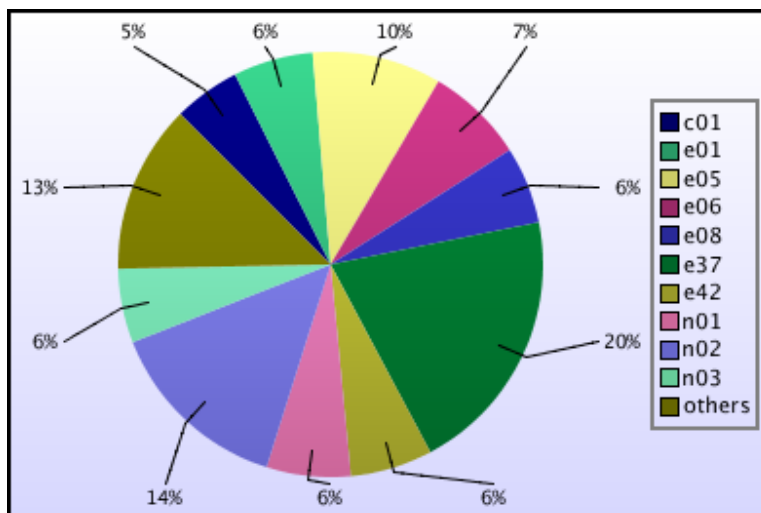
p01	0	7	33	0.0%
<i>PPARC Total</i>	0	7	33	0.0%

c01	65519	139	313683	5.1%
<i>CCLRC Total</i>	65519	139	313683	5.1%

b08	3224	151	16244	0.3%
<i>BBSRC Total</i>	3224	151	16244	0.3%

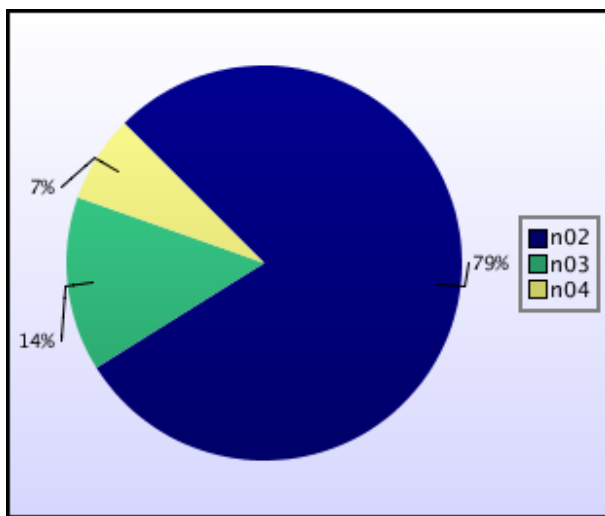
x01	30244	30	145751	2.4%
<i>External Total</i>	30244	30	145751	2.4%

z001	1259	14	6126	0.1%
z002	0	0	0	0.0%
z004	5	7	57	0.0%
z06	34	0	163	0.0%
<i>HPCx Total</i>	1297	21	6346	0.1%



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>
n02	90298	313	436242	78.6%
n03	16462	0	79255	14.3%
n04	8180	0	39383	7.1%
<i>NERC Total</i>	114940	313	554880	100.0%



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.

Main service

<i>Number of processors</i>	<i>Raw AUs</i>	<i>%age</i>	<i>Number of jobs</i>
≤32	571014	9.3%	3055
33–64	674654	11.0%	883
65–128	1577988	25.6%	1221
129–256	1866301	30.3%	897
257–512	1072596	17.4%	110
513–1024	398261	6.5%	48
>1024	0	0.0%	0

Overall utilisation of the main service was 72.3%. Capability usage was 23.9% of the total.

Development Service

<i>Number of processors</i>	<i>Raw AUs</i>	<i>%age</i>	<i>Number of jobs</i>
≤32	516765	93.4%	6828
33–64	34465	6.2%	263
65–128	2145	0.4%	6
129–256	0	0.0%	0

Overall utilisation of the development service was 81.7%.

2.4 Slowdown and Job Wait Times

Slowdowns

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

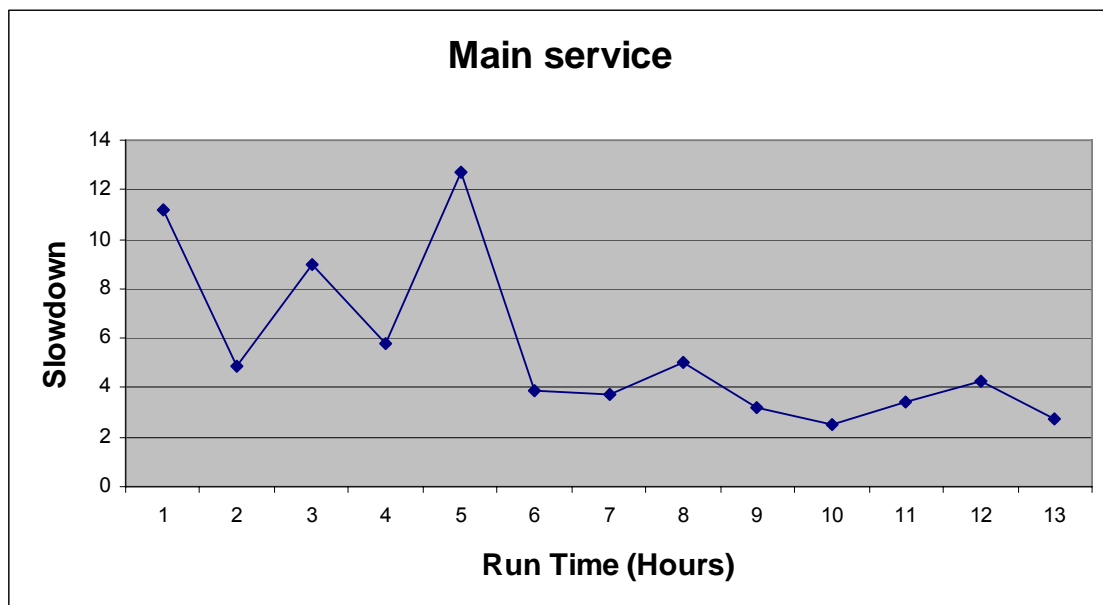
$$\text{Slowdown} = (\text{job run time} + \text{job wait time}) / (\text{job run time})$$

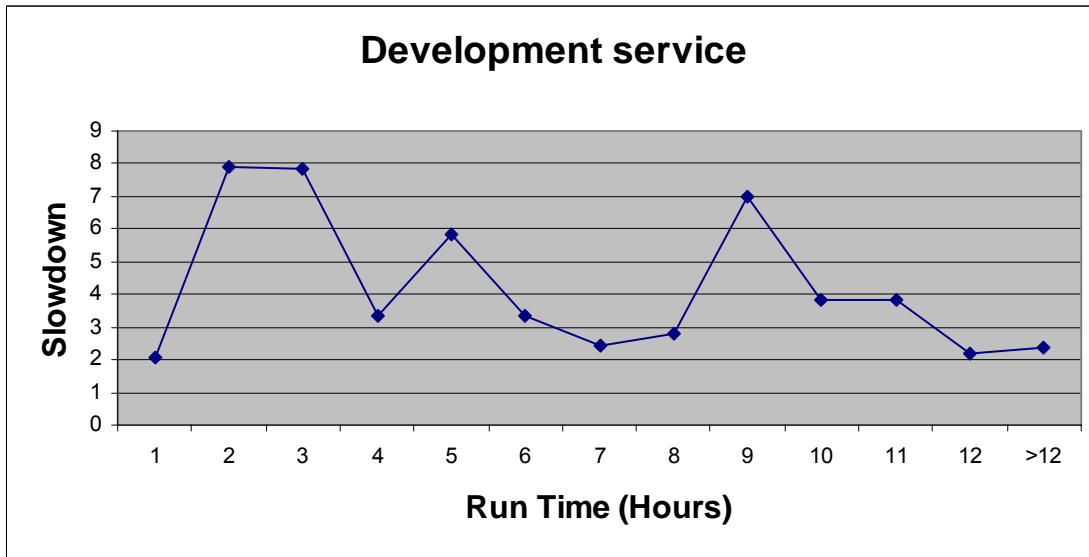
Slowdowns of less than around 10 are usually regarded as reasonable.

On both services, slowdowns are currently generally satisfactory.

Slowdowns by runtime

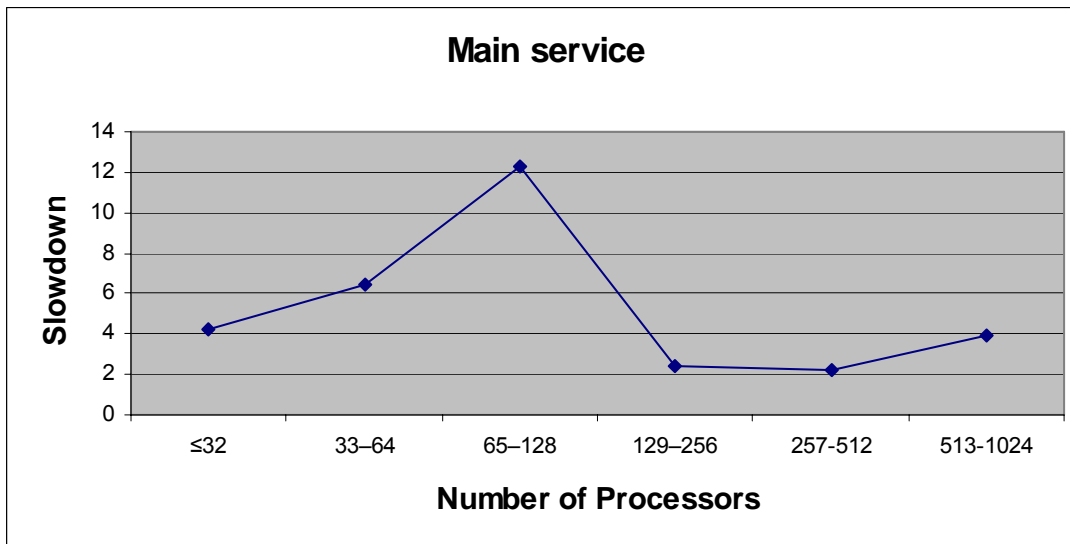
The following graphs show the slowdowns recorded for jobs of differing run times, ignoring those which ran for less than 5 minutes.

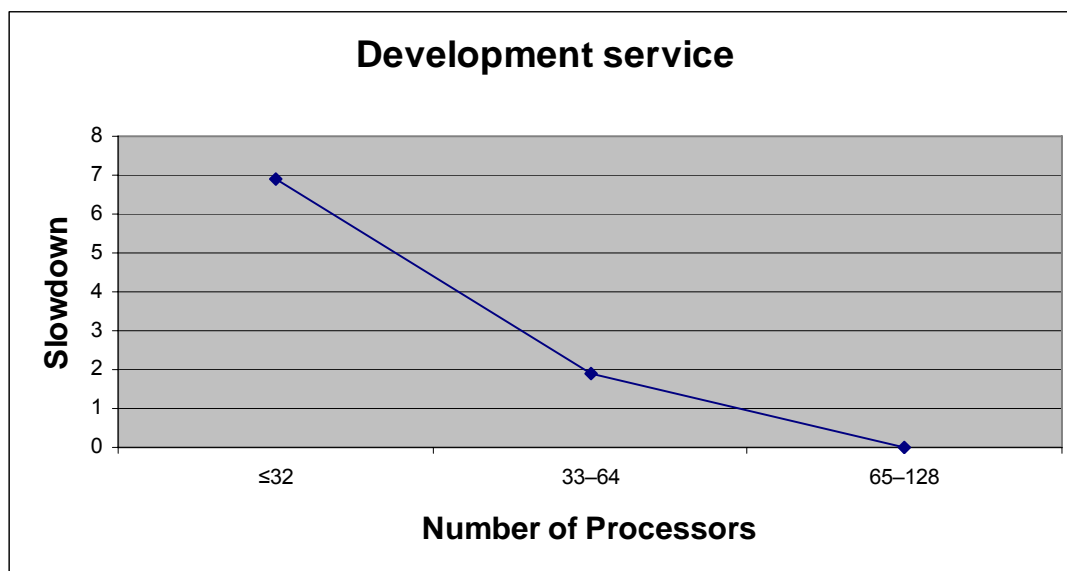




Slowdowns by number of processors

In the graphs below, we plot the slowdown figures against the number of processors used. Only jobs which ran for more than 1 hour are included.



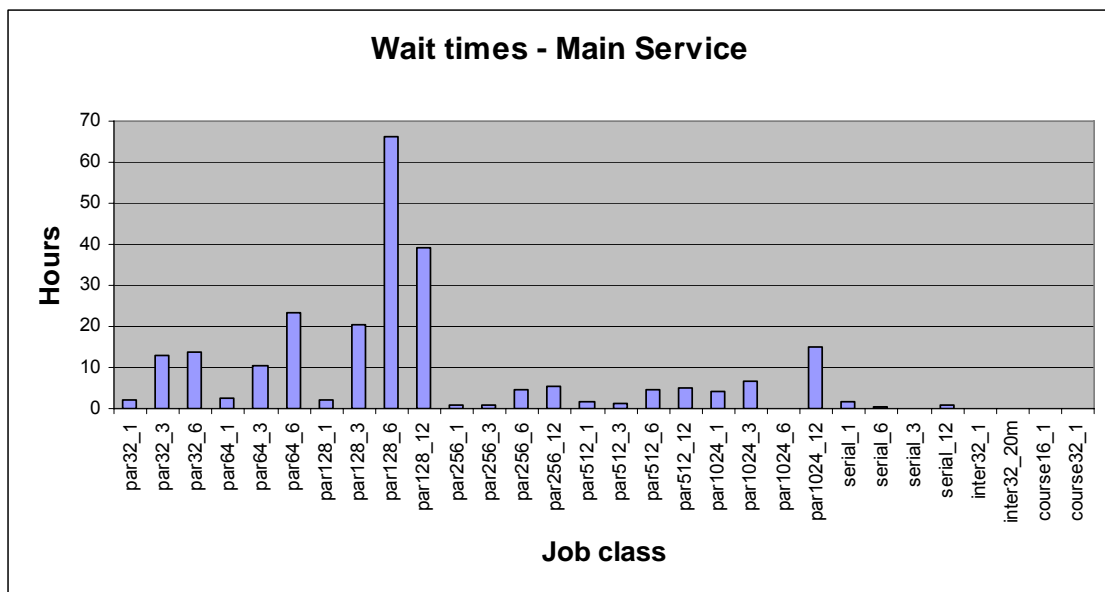


Job wait times – main service

The following table and graph shows the average wait time (in hours) for each class of job on the main service. The long wait times for long 128-processor jobs are attributable to the high utilisation of the capacity region.

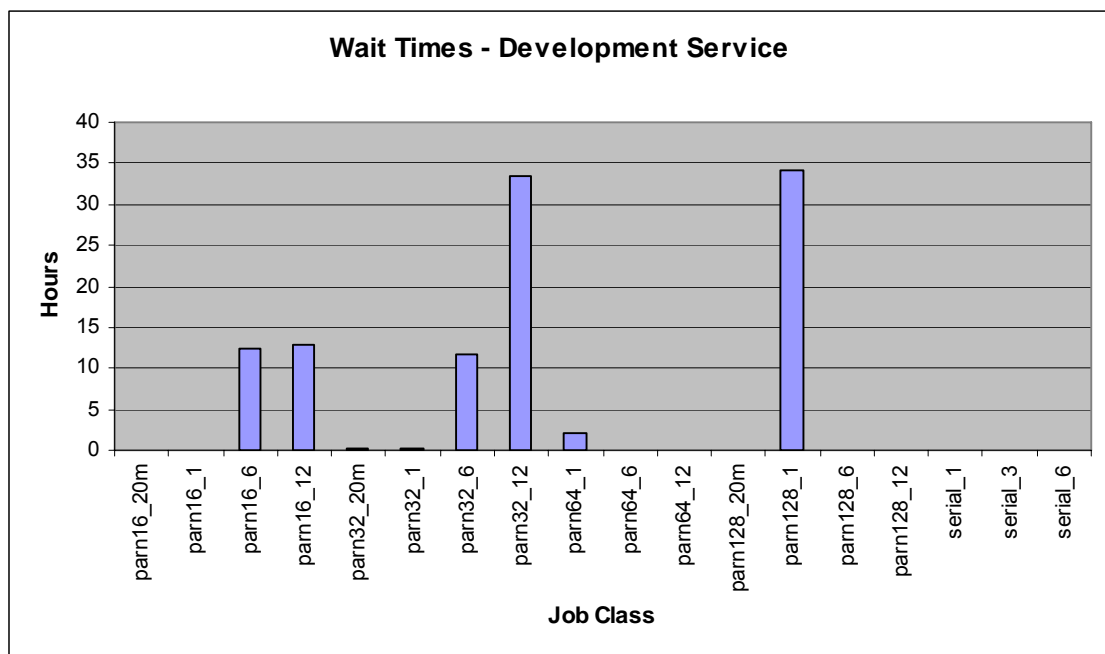
Job Class	Category	Maximum Number of CPUs	Maximum Job length	Average wait time	Number of Jobs
par32_1	parallel	32	1	1.9	1732
par32_3	parallel	32	3	13.1	371
par32_6	parallel	32	6	13.6	952
par64_1	parallel	64	1	2.5	331
par64_3	parallel	64	3	10.4	41
par64_6	parallel	64	6	23.3	511
par128_1	parallel	128	1	2.1	709
par128_3	parallel	128	3	20.5	69
par128_6	parallel	128	6	66.3	227
par128_12	parallel	128	12	39.1	216
par256_1	parallel	256	1	0.8	434
par256_3	parallel	256	3	0.7	104
par256_6	parallel	256	6	4.6	127
par256_12	parallel	256	12	5.4	232
par512_1	parallel	512	1	1.5	41
par512_3	parallel	512	3	1.1	6
par512_6	parallel	512	6	4.5	8
par512_12	parallel	512	12	5.0	55
par1024_1	parallel	1024	1	4.1	27
par1024_3	parallel	1024	3	6.5	10

par1024_6	parallel	1024	6	0.0	0
par1024_12	parallel	1024	12	14.9	11
serial_1	serial	1	1	1.5	1195
serial_6	serial	1	6	0.2	105
serial_3	serial	1	3	0.0	65
serial_12	serial	1	12	0.9	121
inter32_1	interactive	32	1	0.0	1317
inter32_20m	interactive	32	1	0.0	2258
course16_1	interactive	16	1	0.0	114
course32_1	parallel	32	1	0.0	6



Job wait times – development service

Job Class	Category	Maximum Number of CPUs	Maximum Job length	Average wait time	Number of Jobs
parn16_20m	parallel	16	20 mins	0.0	1190
parn16_1	parallel	16	1 hour	0.1	3178
parn16_6	parallel	16	6 hours	12.5	396
parn16_12	parallel	16	12 hours	12.8	418
parn32_20m	parallel	32	20 mins	0.2	379
parn32_1	parallel	32	1 hour	0.3	1059
parn32_6	parallel	32	6 hours	11.7	115
parn32_12	parallel	32	12 hours	33.5	93
parn64_1	parallel	64	1 hour	2.0	263
parn64_6	parallel	64	6 hours	0.0	0
parn64_12	parallel	64	12 hours	0.0	0
parn128_20m	parallel	128	20 mins	0.0	0
parn128_1	parallel	128	1 hour	34.0	6
parn128_6	parallel	128	6 hours	0.0	0
parn128_12	parallel	128	12 hours	0.0	0
serial_1	serial	1	1 hour	0.0	3836
serial_3	serial	1	12 hours	0.0	34
serial_6	serial	1	12 hours	0.0	1



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	34058	50,000
b03	52711	50,000
b08	5493	50,000
c01	122767	150,000
e01	53103	58,829
e02	23079	38,829
e03	56287	225,012
e05	311842	576,050
e06	286633	300,000
e08	87622	100,000
e10	75502	150,000
e11	37645	100,000
e14	80786	100,000
e15	40791	50,000
e16	133	20,000
e17	47955	50,000
e18	32350	40,000
e19	1417	40,000
e20	59001	60,000
e21	567	50,000
e22	4704	10,000
e23	2035	50,000
e24	68975	394,376
e25	9929	50,000
e26	17274	20,000
e27	18032	20,000
e29	20835	30,000
e30	0	40,000
e31	42263	50,000
e32	47039	50,000
e33	5147	50,000
e34	0	50,000
e35	26751	100,000
e36	46470	50,000
e37	89110	100,000
e38	7213	50,000
e39	49979	50,000
e40	6047	50,000

e41	1521	100,000
e42	23109	100,000
e45	13211	50,000
e46	6569	50,000
e47	0	50,000
e48	5	50,000
e49	40573	50,000
e50	3234	13,000
e51	4400	50,000
e52	11	50,000
e53	1397	50,000
e54	1085	50,000
e55	1664	50,000
e56	47509	50,000
e57	0	50,000
e58	0	100,000
e60	0	50,000
n01	47571	100,000
n02	158897	298,000
n03	68268	100,000
n04	284341	299,999
p01	177303	200,000
x01	35229	50,000
x02	8746	20,000
x03	4227	50,000
z001	423277	500,000
z002	44263	124,000
z003	0	3
z004	79758	100,000
z05	4188	30,000
z06	55278	75,000
z07	29637	50,000
z10	2	50,000

Workspace

<i>Consortium</i>	<i>Disc Occupancy (Mb)</i>	<i>Disc Quota (Mb)</i>
b02	15	1,025
b03	47908	100,000
b08	5093	50,000
c01	93430	100,000
e01	1152073	1,249,995
e02	8355	10,000
e03	10	500,000
e05	341832	598,004
e06	336893	400,000

e08	141	5,000
e10	284223	400,000
e11	39628	100,000
e14	207191	250,000
e15	37597	100,000
e16	0	60,000
e17	36112	100,000
e18	24820	80,000
e19	169181	200,000
e20	941818	1,000,000
e21	1	100,000
e22	0	20,000
e23	99997	100,000
e24	1951712	2,800,000
e25	120818	150,000
e26	0	40,000
e27	1	40,000
e29	5296	8,000
e30	0	80,000
e31	96130	100,000
e32	99998	100,000
e33	16093	100,000
e34	0	100,000
e35	0	200,000
e36	35655	50,000
e37	111660	150,000
e38	0	100,000
e39	0	100,000
e40	0	100,000
e41	36462	200,000
e42	202447	400,000
e45	0	100,000
e46	0	50,000
e47	0	160,000
e48	5595	200,000
e49	25224	50,000
e50	150660	100,000
e51	0	100,000
e52	0	50,000
e53	1546	150,000
e54	0	100,000
e55	0	100,000
e56	99999	100,000
e57	0	100,000
e58	0	200,000
e60	0	100,000
n01	184657	800,000
n02	2111086	2,999,904

n03	1001	71,002
n04	244622	750,000
p01	41764	50,000
x01	129271	160,000
x02	0	20,000
x03	178	50,000
z001	419606	500,000
z002	901	770
z003	0	3
z004	4577	25,000
z05	4740	20,000
z06	57154	100,000
z07	22	20,000
z10	0	50,000

Development service space

This is the disk space reserved for users of the development service.

<i>Consortium</i>	<i>Disc Occupancy (Mb)</i>	<i>Disc Quota (Mb)</i>
n01	0	500,000
n02	6141966	7,920,003
n04	222299	526,899

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	7231	65
e01	50	50	149735	4904
e03	5	5	18797	429
e14	10	10	391623	595
e15	1	3	26	6
e24	10	10	14459	1524
e26	2	2	545	27
e42	10	10	29481	447
n01	271	285	31446	29453
n02	328	330	419742	38363
n04	28	30	116775	3740
z001	7	10	11045	67
z002	3	4	5802	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	45	43.7
Technical	50	48.5
In-depth	8	7.8
PMR	0	0.0
TOTAL	103	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 3 platform	85	82.5
Website	0	0.0
Other/general	18	17.5
TOTAL	103	100.0

Performance

<i>All non-indepth queries</i>	<i>Number</i>	<i>%</i>	<i>Target</i>
Finished within 24 Hours	64	67.4	75%
Finished within 72 Hours	93	97.9	97%
Finished after 72 Hours	2	2.1	

<i>Administrative queries</i>	<i>Number</i>	<i>%</i>	<i>Target</i>
Finished within 48 Hours	44	97.8	97%
Finished after 48 Hours	1	2.2	

Experts Handling Queries

<i>Expert</i>	<i>Admin</i>	<i>Technical</i>	<i>In-Depth</i>	<i>PMR</i>
epcc.ed.ac.uk	32	19	7	0
dl.ac.uk	2	15	0	0
Sysadm	10	16	1	0
Other people	1	0	0	0

3.2 Training

<i>Title of Course</i>	<i>Start Date</i>	<i>Length (Days)</i>	<i>Place days</i>	<i>HPCx User Days</i>	<i>HPCx Staff Days</i>
Using the IBM HPC Toolkit (HPCT)	17-Jan	2	50	14	24
Shared Memory Programming with Open MP	24-Jan	2	60	42	0

4 Staffing

4.1 Science Support Staffing

Daresbury Laboratory

<i>Name</i>	<i>Days</i>
Ashworth	13.1
Blake	1.8
Bush	18.0
Guest	5.0
Johnstone	6.6
Jones	1.6
Plummer	11.0
Sunderland	22.0
Total (Days)	79.1
FTEs	4.5

EPCC

<i>Name</i>	<i>Days</i>
Simpson	14.8
Booth	16.1
Henty	6.0
Smith	11.7
Bull	8.2
Fisher	5.0
Hein	11.1
Jackson	2.0
Reid	6.1
Stratford	6.2
Nazarova	6.5
Trew	4.3
Gray	2.8
D'Mellow	16.2
Hill	2.9
Maynard	1.7
Weiland	20.5

Guo	3.2
Piotrowski	2.2
Helpdesk	3.9
Total (Days)	152.6
FTEs	8.5

Reported under *Other staff* are the additional contributions of recently-graduated MSc students, employed on a temporary basis.

Overall Levels

	<i>FTEs</i>
DL	4.5
EPCC	8.5
Total	13.0

4.2 Systems Staffing

<i>Name</i>	<i>Days</i>
Andrews	17.6
Blake	0.0
Brown	22.0
Fisher	9.0
Georgeson	17.6
Franks	17.6
Jones	0.8
BITD	17.6
Total (Days)	102.2
FTEs	5.8

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%	100.0%
Technology MTBF (hours)	200	300	∞
Number of AV FTEs	7.5	10	13.0
Number of training days per month	20/12	25/12	4/1
Non in-depth queries resolved within 3 days	85%	97%	97.9%
Number of A&M FTEs	3.75	5.75	5.8
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>
e01	1	UK Turbulence Consortium	Dr Gary Coleman
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

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
e34	1	Dissolution of Bioactive Phosphate Glasses	Dr N de Leeuw
e35	1	Non-adiabatic processes	Dr T Todorov
e36	1	Jets in Cross-Flow	Dr Y Yao
e37	1	LESUK_3	Prof J J McGuirk
e38	1	Viscoelastic deformation in 3D non-linear media	Prof Greg A Houseman
e39	1	The Supergen 5 biological fuel cells consortium	Prof FA Armstrong
e40	1	Computational Quantum Many-Body Theory	Prof R Needs
e41	1	Flow in Weapon Bays	Dr George N Barakos
e42	1	Computational Combustion for Engineering Applications	Prof K Luo
e45	1	Metals under extreme conditions	Prof Mike Gillan
e46	1	Advanced materials with complex architectures	Dr Paul Mummery
e47	1	Parallel stochastic analysis for geo-engineering	Dr Michael A. Hicks
e48	1	Organised structure in turbulent flows	Prof Sergei Chernyshenko
e49	1	Integrated Programme of Research in Aeronautical Engineering	Prof Michael Leschziner
e50	1	Biological interface with materials	Prof John Harding
e51	1	Super-computing data mining	Dr Mike Pettipher
e52	1	Spacecraft force modelling	Dr M Ziebart
e53	1	Large-scale communication networks	Prof J M Pitts
e54	1	Free surface simulation of waves overtopping during storms	Dr D M Ingram
e55	1	High-Reynolds-Number Near-Wall Flows	Prof Michael Leschziner
e56	1	Infectious disease threats	Dr Iain Barrass

e57	1	Triplex DNA Structures	Dr Hooshang Nikjoo
e58	1	Quantum Simulations for Chemical Biology	Dr Carmen Domene
e60	1	Device Electronics Based on nanoWires and NanoTubes	Dr Merlyne M de Souza
e61	1	Enhancement of droplet concentrations in clouds	Dr Alan A M Gadian

Note: The original project e01 ended on 30 April 2005. The new UKTC project started on 1 March 2006. At the request of the PI it was assigned the same code as the old one, and inherited its disk space.

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

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 Judy Hardy
x03	IBM	Mr Derrick J Byford

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
z10	Globus	Dr Stephen P Booth

B.2 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
e04	1	Chemreact Computing Consortium	Prof Jonathon Tennyson
e07	2	Turbulent Plasma Transport in Tokamaks	Dr Colin M Roach
e09	2	Molecular Properties and their Geometry	Dr Mark R Wilson

e12	1	Parallel programs for the simulation of complex fluids	Dr Richard J Blake
e13	1	TeraGyroid project	Mr Mark Westwood
e28	1	Towards the Dynome	Dr Jonathan W Essex
z09		HECToR Benchmarking	Dr Edward Smyth
x02		OHM Ltd	Dr Lucy MacGregor
n05	2	Non-linear Wave-particle Instabilities in Plasmas	Dr Mervyn Freeman