

HPCx Service Report

February 2003

1 Introduction

This report covers the period from 1 February 2003 at 0800 to 1 March 2003 at 0800. This gives a service month of 672 hours.

The early months of service are typically a 'bedding-in' period --- nevertheless, the numbers of failures and incidents has again been higher than we would have liked.

2 Usage

2.1 Availability

Incidents

During this month, there were 22 incidents; the following table indicates the severity levels of the incidents, where severity level 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	7
2	9
3	6
4	0

The attributions for the SEV 1 incidents were as follows:

<i>SEV 1</i>	<i>Incidents</i>	<i>MTBF</i>
IBM	4.75	141
Site	1.25	538
External	1	672
<i>Total</i>	7	96

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

<i>Failure</i>	<i>Site</i>	<i>IBM</i>	<i>External</i>	<i>Reason</i>
03.035	25%			Site may have been responsible for initial looseness of cable
		25%		IBM may have been responsible for initial looseness of cable
		50%		Undocumented dependency on CWS by GPFS
03.036		100%		During IBM investigation into #03.035
03.038			100%	Loss of JANET connection external to site
03.040	100%			Uninterrupted access to external network is site responsibility
03.043		100%		Availability of GPFS is technology supplier responsibility
03.046		100%		Operation of switch fabric is technology supplier responsibility
03.049		100%		Network interface on system is technology supplier responsibility

Availability

<i>Attribution</i>	<i>Wallclock Hours Lost</i>	<i>Serviceability</i>
IBM	11.74	98.3%
Site	2.72	99.6%
External	0.67	99.9%
Overall	15.13	97.8%

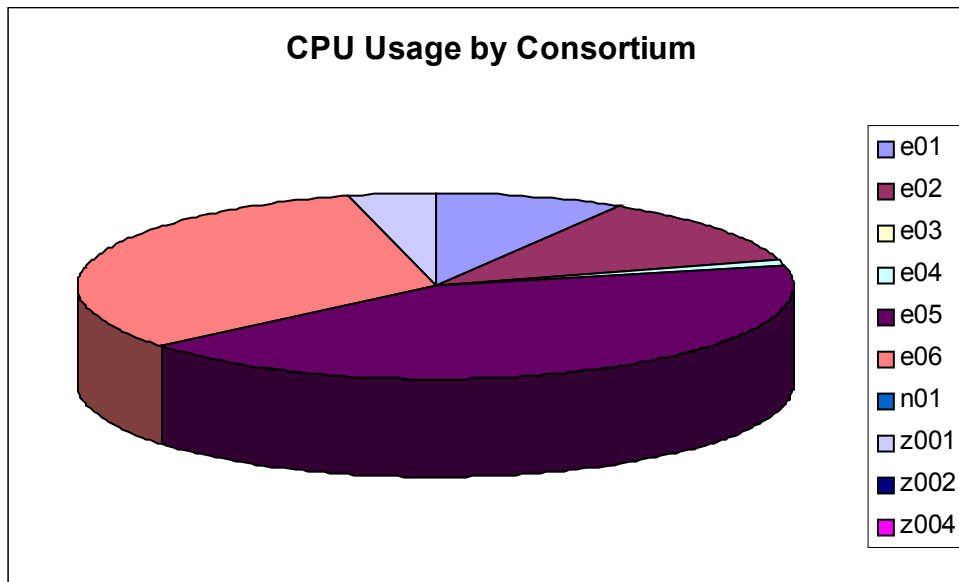
Processor hours lost: 19447.6 (out of 860160)
 Processor serviceability: 97.7%

2.2 CPU Usage by Consortium

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

<i>Consortium</i>	<i>CPU Hours (Parallel)</i>	<i>CPU Hours (Serial)</i>	<i>AUs</i>	<i>%age</i>
e01	44490.15	0.02	106776	8.73%
e02	58424.09	0.00	140218	11.47%
e03	49.93	2.82	127	0.01%
e04	5833.63	3.94	14010	1.15%
e05	216410.18	0.00	519384	42.47%
e06	164842.09	4.64	395632	32.35%
<i>EP SRC Total</i>	490050.07	11.42	1176148	96.18%
n01	2.04	0.00	5	0.0%
<i>NERC Total</i>	2.04	0.00	5	0.0%

z001	18947.78	8.51	45495	3.72%
z002	501.29	0.00	1203	0.1%
z004	0.00	0.67	2	0.0%
<i>HPCx Total</i>	19449.07	9.18	46700	3.82%



2.3 CPU Usage by Job Type

<i>Number of Processors</i>	<i>CPU Hours</i>	<i>%age</i>	<i>Number of Jobs</i>
8	4905.63	0.96%	2150
16	9443.50	1.85%	701
32	32224.33	6.32%	909
64	41069.39	8.06%	321
128	301192.52	59.11%	803
256	80513.69	15.80%	109
512	26448.26	5.19%	47
1024	13269.40	2.60%	29
1280	307.56	0.06%	5

Development Region (192 CPUs): a total of 87643 CPU hours were used which represents 67.93% utilization of the maximum available in this region.

Capability Region (1024 CPUs): a total of 421731 CPU hours were used which represents 61.29% utilization of the maximum available in this region.

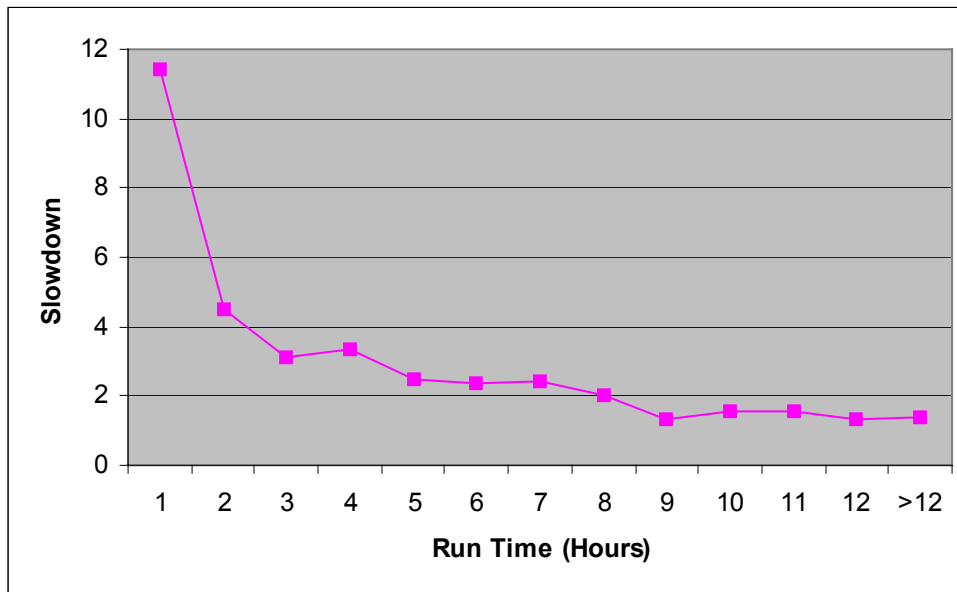
Serial Region (64 CPUs): a total of 21 CPU hours were used which represents 0.04% utilization of the maximum available in this region.

2.4 Job Wait Times

Slowdown

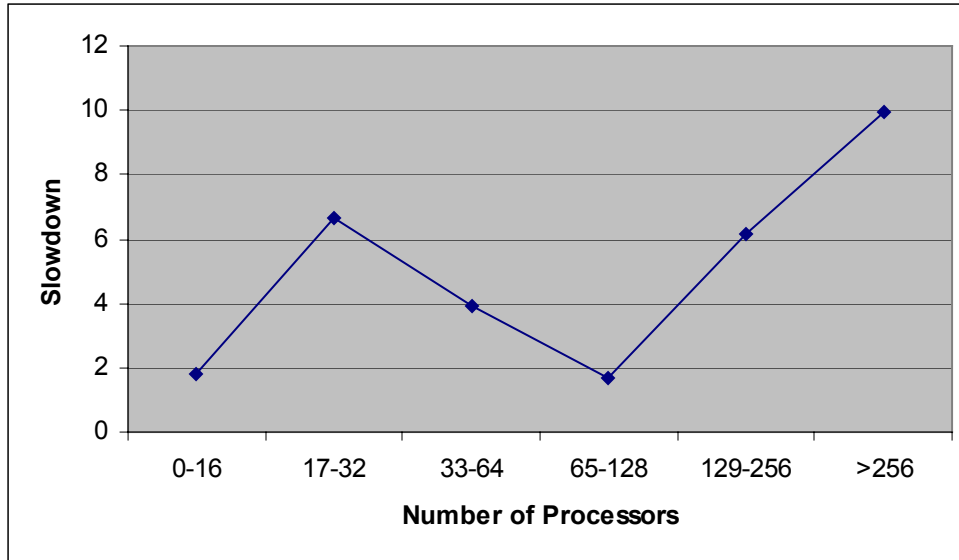
Slowdown is a widely used measure of the relative wait times of different classes of jobs. It is defined as:

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



Slowdowns of less than around 10 are usually regarded as reasonable. The above graph plots slowdown against run-time (ignoring jobs of less than 5 minutes duration). The graph demonstrates that only short development jobs had significant slowdowns. It is important to note that as many of these jobs were quite short, the actual job wait times were also relatively short. Moreover, during the early months of service, this category has been very busy.

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



2.5 Disk Occupancy

Home Space

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

<i>Consortium or Sub-consortium</i>	<i>Disc Occupancy (KB)</i>
e01	5775104
e02	3295968
e03	1938272
e04	62687872
e05	135275456
e06	83257344
n01	22401056
n02	2755584
n03	2243040
n04	64
y001	64
y002	161574432
y003	544
y004	4441760
y005	398016
y006	2530944
y007	480
z001	154346112
z002	6115776
z003	224
z004	355264

Workspace

<i>Consortium or Sub-consortium</i>	<i>Disc Occupancy (Kb)</i>
e01	450426272
e02	21568
e03	768
e04	11003392
e05	46939200
e06	111641440
n01	9443904
n02	865888
n03	128
n04	64
y001	64
y002	800
y003	0
y004	256
y005	160
y006	128
y007	128
z001	146398208
z002	0
z003	160
z004	736

2.6 Mass Store

There is currently no usage of the mass store.

3 Support

3.2 Helpdesk

Classifications

<i>Category</i>	<i>Number</i>	<i>% of all</i>
Administrative	38	34.2
Technical	66	59.5
In-depth	7	6.3
TOTAL	111	100.0

<i>Service Area</i>	<i>Number</i>	<i>% of all</i>
Phase 1 platform	95	85.6
Website	9	8.1
Other/general	7	6.3
TOTAL	111	100.0

Performance

<i>All non-indepth queries</i>	<i>Number</i>	<i>%</i>	<i>Target</i>
Finished within 24 Hours	89	85.6	75%
Finished within 72 Hours	102	98.1	97%
Finished after 72 Hours	2	1.9	

<i>Administrative queries</i>	<i>Number</i>	<i>%</i>	<i>Target</i>
Finished within 48 Hours	37	97.4	97%
Finished after 48 Hours	1	2.6	

Experts Handling Queries

<i>Expert</i>	<i>Admin</i>	<i>Technical</i>	<i>In-Depth</i>
epcc.ed.ac.uk	14	30	
dl.ac.uk	2	11	3
Sysadm	22	24	2
Other people		1	2

3.3 Training

We ran 3 different courses during January. The first of these was the first of our applications-specific courses and focused on DL_POLY.

<i>Title of Course</i>	<i>Start Date</i>	<i>Length (Days)</i>	<i>HPCx Users</i>	<i>HPCx Staff</i>
Applications: DL_POLY	10/2/03	1	21	0
Applied Numerical Algorithms	11/2/03	3	2	1
Applied Computer Science	25/2/03	3	3	1

4 Staffing

4.1 Science Support Staffing

Daresbury Laboratory

<i>Name</i>	<i>Days</i>
Ashworth	13.5
Blake	5.0
Bush	20.0
Guest	9.5
Plummer	0.0
Sunderland	17.0
Jones	5.0
<i>Total</i>	<i>70.0</i>
<i>FTEs</i>	<i>3.7</i>

EPCC

<i>Name</i>	<i>Days</i>
Simpson	7.3
Booth	13.3
Henty	9.3
Breitmoser	8.0
Bull	5.3
Egbert	0.7
Fisher	18.7
Hare	6.1
Hein	21.9
Jackson, A N	8.8
Jackson, W A	16.0
Johnson	8.7
Murdoch	0.4
Pringle	10.4
Smith	4.5
Stratford	1.5
Helpdesk	0.8
<i>Total (Days)</i>	<i>141.7</i>
<i>FTEs</i>	<i>8.0</i>

Overall FTE Levels

	<i>February</i>
DL	3.7
EPCC	8.0
<i>Total</i>	11.7

4.2 Systems Staffing

<i>Name</i>	<i>Days</i>
Andrews	12.0
Blake	5.0
Brown	19.0
Elwell	15.0
Franks	14.3
Jones	5.0
Shore	15.0
Walmsley	17.0
BITD	23.0
<i>Total</i>	125.3
<i>FTEs</i>	7.1

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 that 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 Availability	80%	99.2%	98.3%
Technology MTBF (hours)	200	300	141
Number of AV FTEs	7.5	10	11.7
Number of training days per month	30/12	40/12	7
Non in-depth queries resolved within 3 days	85%	97%	98.7%
Number of A&M FTEs	3.75	5.75	7.1
A&M serviceability	80%	100%	99.6%

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: Current Projects

EPSRC Projects

<i>Code</i>	<i>Title</i>	<i>PI</i>
e01	UK Turbulence Consortium	Prof Neil Sandham
e02	Ab-initio simulation of covalently bonded materials	Dr Patrick Briddon
e03	Multi-photon, electron collisions and BEC HPC consortium	Prof Ken Taylor
e04	Chemreact Computing Consortium	Prof Jonathon Tennyson
e05	Materials Chemistry using Terascaling Computing	Prof Richard Catlow
e06	UK Car-Parrinello Consortium	Prof Paul Madden

NERC Projects

<i>Code</i>	<i>Title</i>	<i>PI</i>
n01	Large-Scale Long-Term Ocean Circulation	Dr David Webb
n02	NCAS	Prof Alan J Thorpe
n03	Computational Mineral Physics Consortium	Dr John Brodholt
n04	Shelf Seas Consortium	Dr Roger Proctor

Early User Projects

<i>Code</i>	<i>Title</i>	<i>PI</i>
y001	Materials	Dr Patrick Briddon
y002	DNS of Turbulent Flow	Prof Neil Sandham
y003	Multi-photon and Electron Collision Processes	Prof Ken Taylor
y004	Materials	Prof Jonathon Tennyson
y005	UKAEA	Dr Tim Hender
y006	UK Car-Parrinello Consortium	Prof David Price
y007	Climate Modelling	Ms Lois Steenman-Clark

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