



ARCHER SP Service Quarterly Report

Quarter 3 2015



Document Information and Version History

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Version	Date	Comments, Changes, Status	Authors, contributors, reviewers
0.1	2015-09-30	Initial Draft	Anne Whiting
0.2	2015-10-06	Added Graphs and Phone details	Jo Beech-Brandt
0.3	2015-10-08	Review of preliminary text	Andy Turner, Anne Whiting
0.4	2015-10-12	Final review	Alan Simpson
1.0	2015-10-13	Version sent to EPSRC	Alan Simpson
1.1	2015-11-09	Updated Wallclock Graphs	Jo Beech-Brandt

1. The Service

1.1 Service Highlights

This is the report for the ARCHER SP Service for the Reporting Periods:

July 2015, August 2015, September 2015

- Utilisation on the system during 15Q3 was 88%, compared to 87% in 15Q2.
- Benefits realisation measurement continues, together with the creation of case studies, in conjunction with work to identify additional or alternative metrics that may present the benefits in a more meaningful way.
- The Sonexion Lustre file system again had a significant impact on this quarter:
 - Successful mitigation strategies taken by EPCC during the file system crisis and now included in standard procedures and SAFE functionality going forward:
 - Frequent and targeted user communications from EPCC to ensure users were informed, to facilitate the uptake of remedial actions, and the minimising of user impact
 - EPCC acting as the user advocate at all times to ensure the user experience was kept at the centre of planned work
 - The provision of temporary project access – this option could be used in the future if required
 - The changes needed to provide a partial per file system service
 - The central installation of application packages so that they are available to any individual file system
 - Publication of user guidelines on data management
 - Validation of the importance of assigned consortium contacts within EPCC working with their consortium to provide bi-directional communication
 - Disk replacement schedule

A program of work was instigated by Cray to replace the disks in ARCHER using the natural failover and rebuild functionality built into the system. An investigation into user performance issues reported, resulted in the discovery that there was a much higher user performance impact for disks that had never been rebuilt before. EPCC advised Cray on the rebuild schedule to group initial rebuilds together, allowing users to schedule their work accordingly and therefore minimise impact on user workload as much as possible. The disk replacements proceeded on schedule and finished on 10th October as planned. Users have been very understanding once the initial rebuild issue had been highlighted and work planned accordingly. The failure rate of the new disks in the system is in line with advertised levels.
 - Impact of raid check

The frequency of running raid check had been reduced from the recommended weekly occurrence because of the impact it had on user performance. Following the disk problems raid check was run on a weekly basis. The greatest impact was on the NCAS (n02) users of the Unified Model (UM), running on fs2. Most other users did not report degraded performance. EPCC facilitated testing of impact of raid check on the UM in collaboration with NCAS. The results from this testing were used to push for updated versions of the raid check software from Cray to minimise impact on users. Due to this effort, the impact on the UM performance was reduced from a 30-40% slowdown with the initial version of the raid check software to a 5% slowdown with the version currently installed. Once the disk replacements are complete it is planned to return to a monthly raid check schedule.

- Clearing up of temporary project
During the initial stage of the file system issues, when different file systems were temporarily unavailable on the system, EPCC put in place a temporary project with access to a working file system to allow affected users to continue their research on ARCHER. This also helped ensure that overall utilisation did not drop significantly. The new end-of-life procedure has been used to help users clear any required data from the v01 temporary project in preparation for its removal.
- Lessons learned
An internal lessons learned review has been carried out by EPCC both to facilitate continuous improvement of the service offered and in preparation for the review to be carried out by EPSRC's consultant.

1.2 Forward Look

- The CLE upgrade scheduled for 22 July was deferred until after the completion of the disk replacement programme and is now scheduled for 11 November. Cray have confirmed that the existing version of CLE will be supported for critical security updates until CLE 5.2 is installed on the service in November:
 - The CLE on the TDS was upgraded at the end of September. Extensive testing is being carried out on the TDS to prepare support staff and to create guidance information for users;
 - The system management workstation (SMW) will be upgraded on 14 October 2015, prior to the CLE upgrade;
 - Advice will be provided to users on actions required following upgrade (such as recompiling applications and verifying output).
- Cray will be replacing cables in the high speed network infrastructure on 3 and 4 November 2015;
- RSIP node implementation will allow the use of applications requiring license servers on the compute nodes, for example, compilers and ISV applications. RSIP has been used to provide licenses to the compute nodes for the commercial CFD software STAR-CCM+ from CD-Adapco. The implementation will be scheduled once the CLE upgrade is complete;
- Investigation into file system problems:
 - A lessons learned analysis will be carried out involving EPSRC, Cray and EPCC led by David Cain, EPSRC's consultant, to review the handling of the file system problem and to ensure that recommendations for service improvement are identified and implemented;
- There have been a number of PBS-related issues that the Service has raised with Cray and which Cray are taking forward directly (where appropriate) with Altair. These issues are principally with regard to scheduling parameters and it is hoped that improvements in job turnaround and better job placement will result.

2. Contractual Performance Report

This is the contractual performance report for the ARCHER SP Service.

2.1 Service Points and Service Credits

The Service Levels and Service Points for the SP service are defined as below in Schedule 2.2.

- **2.6.2 - Phone Response (PR):** 90% of incoming telephone calls answered personally within 2 minutes for any Service Period. *Service Threshold: 85.0%; Operating Service Level: 90.0%.*
- **2.6.3 - Query Closure (QC):** 97% of all administrative queries, problem reports and non in-depth queries shall be successfully resolved within 2 working days. *Service Threshold: 94.0%; Operating Service Level: 97.0%.*
- **2.6.4 - New User Registration (UR):** Process New User Registrations within 1 working day.

Definitions:

Operating Service Level: *The minimum level of performance for a Service Level which is required by the Authority if the Contractor is to avoid the need to account to the Authority for Service Credits.*

Service Threshold: *This term is not defined in the contract. Our interpretation is that it refers to the minimum allowed service level. Below this threshold, the Contractor is in breach of contract.*

Non In-Depth: *This term is not defined in the contract. Our interpretation is that it refers to Basic queries which are handled by the SP Service. This includes all Admin queries (e.g. requests for Disk Quota, Adjustments to Allocations, Creation of Projects) and Technical Queries (Batch script questions, high level technical ‘How do I?’ requests). Queries requiring detailed technical and/or scientific analysis (debugging, software package installations, code porting) are referred to the CSE Team as In-Depth queries.*

Change Request: *This term is not defined in the contract. There are times when SP receives requests that may require changes to be deployed on ARCHER. These requests may come from the users, the CSE team or Cray. Examples may include the deployment of new OS patches, the deployment Cray bug fixes, or the addition of new systems software. Such changes are subject to Change Control and may have to wait for a Maintenance Session. The nature of such requests means that they cannot be completed in 2 working days.*

2.1.1 Service Points

In the previous Service Quarter the Service Points can be summarised as follows:

Period	Jul 15		Aug 15		Sep 15		15Q3
Metric	Service Level	Service Points	Service Level	Service Points	Service Level	Service Points	Service Points
2.6.2 – PR	100%	-5	100%	-5	100%	-5	-15
2.6.3 – QC	98.4%	-1	97.4%	0	98.0%	-1	-2
2.6.4 – UR	1 WD	0	1 WD	0	1 WD	0	0
Total		-6		-5		-6	-17

The details of the above can be found in Section 2.2 of this report.

2.1.2 Service Failures

There were no service failures in the period as defined in the metric. However outages were approved by EPSRC as required during the process of working to resolve the file system issues.

2.1.3 Service Credits

The total Service Credit applicable for each Service Quarter is calculated in the following way:

Where:

"**Applicable Charge**" = the relevant Annual Maintenance Charge divided by four (4) (to form the Maintenance Charge relevant for the Service Periods being assessed)

"**SC**" = Service Credit

"**TSP**" = Total Service Points for the Service Quarter

As the Total Service Points are negative (-17), no Service Credits apply in 15Q3.

2.2 Detailed Service Level Breakdown

2.2.1 Phone Response (PR)

	Jul 15	Aug 15	Sep 15	15Q3
Phone Calls Received	38 (6)	21 (2)	45 (12)	104 (20)
Answered 2 Minutes	38	21	45	104
Service Level	100.0%	100.0%	100.0%	100.0%

The volume of telephone calls remained low in 15Q3. Of the total of 104 calls received above, only 20 were genuine ARCHER user calls that resulted in queries or answered user questions directly.

2.2.2 Query Closure (QC)

	Jul 15	Aug 15	Sep 15	15Q3
Self-Service Admin	335	158	282	298
Admin	140	117	151	171
Technical	21	27	20	23
<i>Total Queries</i>	496	294	453	492
<i>Total Closed in 2 Days</i>	488	302	444	483
Service Level	98.4%	97.4%	98.0%	98.2%

In addition to the Admin and Technical queries, the following Change Requests were resolved in 15Q3.

	Jul 15	Aug 15	Sep15	15Q3
Change Requests	2	1	2	5

2.2.3 User Registration (UR)

	Jul 15	Aug 15	Sep 15	15Q3
No of Requests	78	38	104	220
Closed in One Working Day	78	38	104	220
Average Closure Time (Hrs)	0.55	0.9	0.56	0.6
Average Closure Time (Working Days)	0.06	0.10	0.06	0.07
Service Level	1 WD	1 WD	1 WD	1 WD

To avoid double counting, these requests are not included in the above metrics for “Admin and Technical” Query Closure.

2.3 Additional Metrics

2.3.1 Target Response Times

The following metrics are also defined in Schedule 2.2, but have no Service Points associated.

Target Response Times	
1	During core time, an initial response to the user acknowledging receipt of the query
2	A Tracking Identifier within 5 minutes of receiving the query
3	During Core Time, 90% of incoming telephone calls should be answered personally (not by computer) within 2 minutes
4	During UK office hours, all non telephone communications shall be acknowledged within 1 Hour

1 – Initial Response

This is sent automatically when the user raises a query to the address helpdesk@archer.ac.uk. Users may choose not to receive such emails by mailing support@archer.ac.uk.

2 – Tracking Identifier

This is sent automatically when the user raises a query to the address helpdesk@archer.ac.uk. Users may choose not to receive such emails by mailing support@archer.ac.uk. The tracking identifier is set in the SAFE regardless which option the user selects.

3 – Incoming Calls

These are covered in the previous section of the report. Service Points apply.

4 - Query Acknowledgement

Acknowledgment of the query is defined as when the Helpdesk assigns the new incoming query to the relevant Service Provider. This should happen within 1 working hour of the query arriving at the Helpdesk. The Helpdesk processed the following number of incoming queries during the Service Quarter:

	Jul15	Aug15	Sep15	15Q3
CRAY	16	19	6	41
ARCHER_CSE	92	104	114	310
ARCHER_SP	862	559	687	2288
Total Queries Assigned	970	682	987	2639
Total Assigned in 1 Hour	970	682	987	2639
Service Level	100%	100%	100%	100%

2.3.2 Maintenance

SP is allowed to book a maximum of two maintenance occasions in any 28-day period, and these shall last no longer than four hours; these are defined as Permitted Maintenance. Such Maintenance Periods are recorded in the Maintenance Schedule. A 6-month forward plan of maintenance has been agreed with the Authority.

It has been agreed with the Authority that SP may combine the hours normally allocated for two consecutive maintenance sessions into a single session with a maximum of eight hours and this has been the normal mode of operation as recorded in the table below. This reduces the number of sessions taken, which reduces user impact since the jobs running on the service have to be drained down once and not twice.

If greater than 4 hours downtime is required for maintenance, 20 days prior approval is required from the Authority. Where possible, SP will perform maintenance on an 'At-risk' basis, thus maximising the Availability of the Service. The following planned maintenance took place in the Service Quarter.

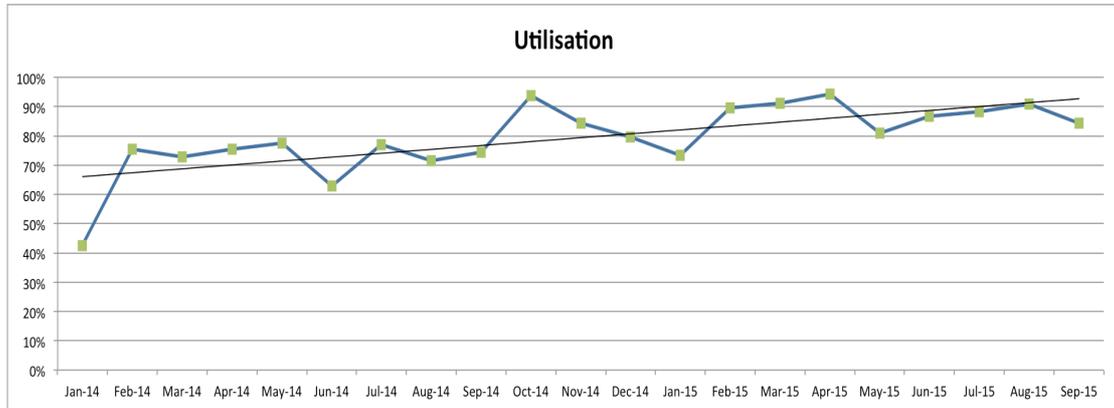
Date	Start	End	Duration	Type	Notes	Reason
22/07/15	09:00	15:20	06:20	Pre-Approved	EPSRC Approved 0900 - 1700	Planned Maintenance

3. Service Statistics

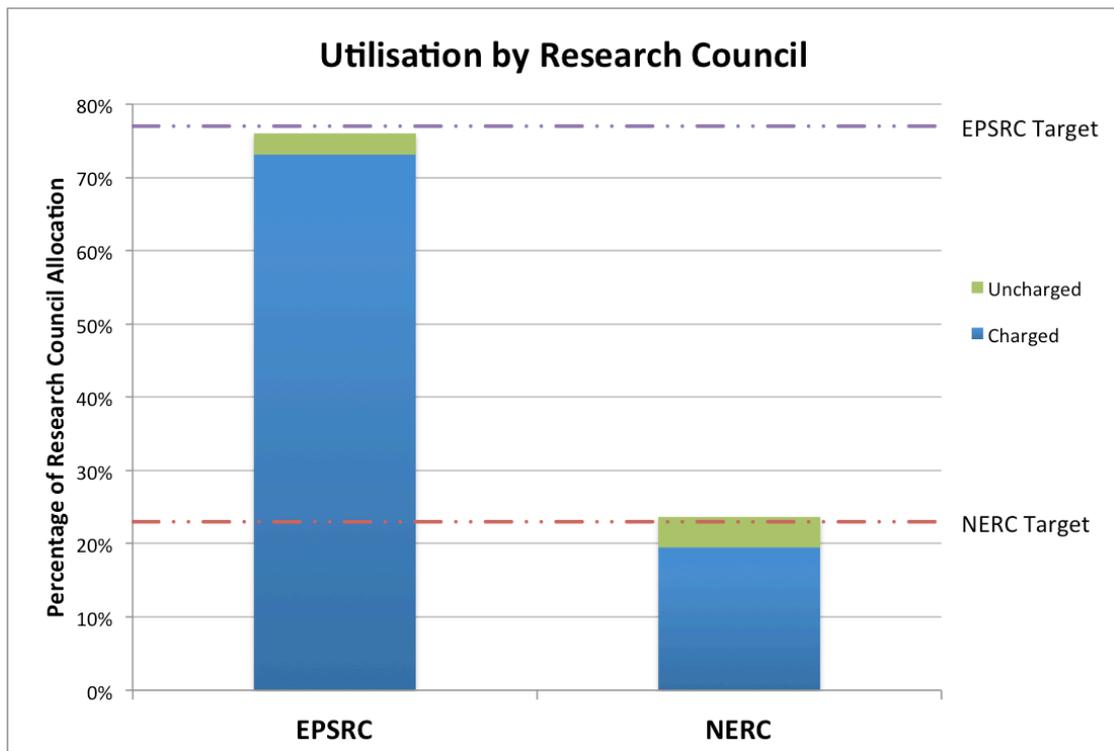
This section contains statistics on the ARCHER service as requested by EPSRC, SAC and SMB.

3.1 Utilisation

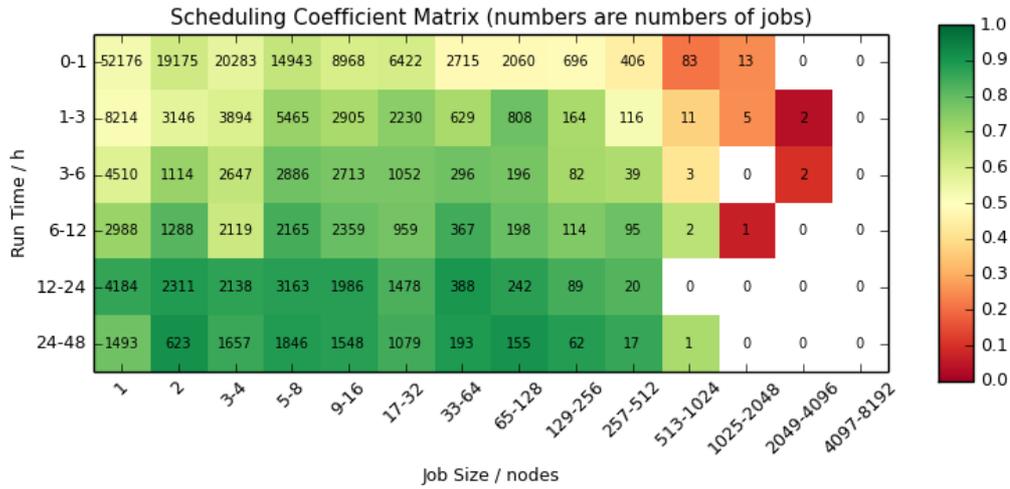
Utilisation over the quarter was 88%. A trendline has been added to the graph.



The utilisation by the Research Councils, relative to their respective allocations, is presented below. This bar chart shows the usage of ARCHER by the two Research Councils presented as a percentage of the total Research Council allocation on ARCHER.



3.2 Scheduling Coefficient Matrix



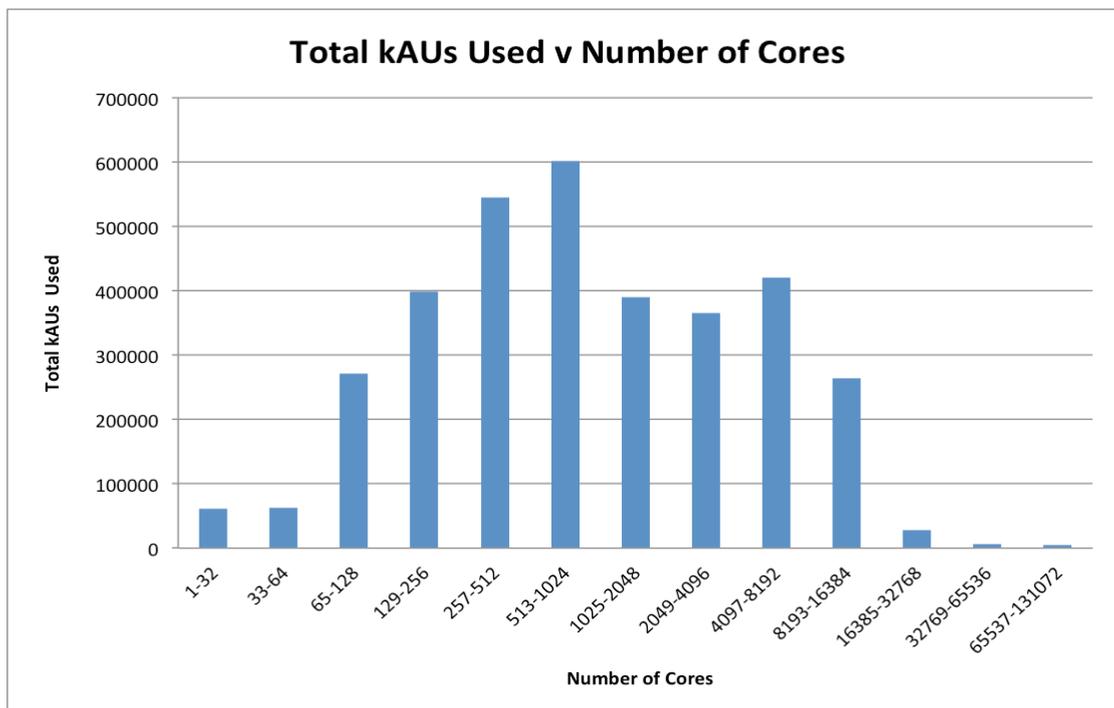
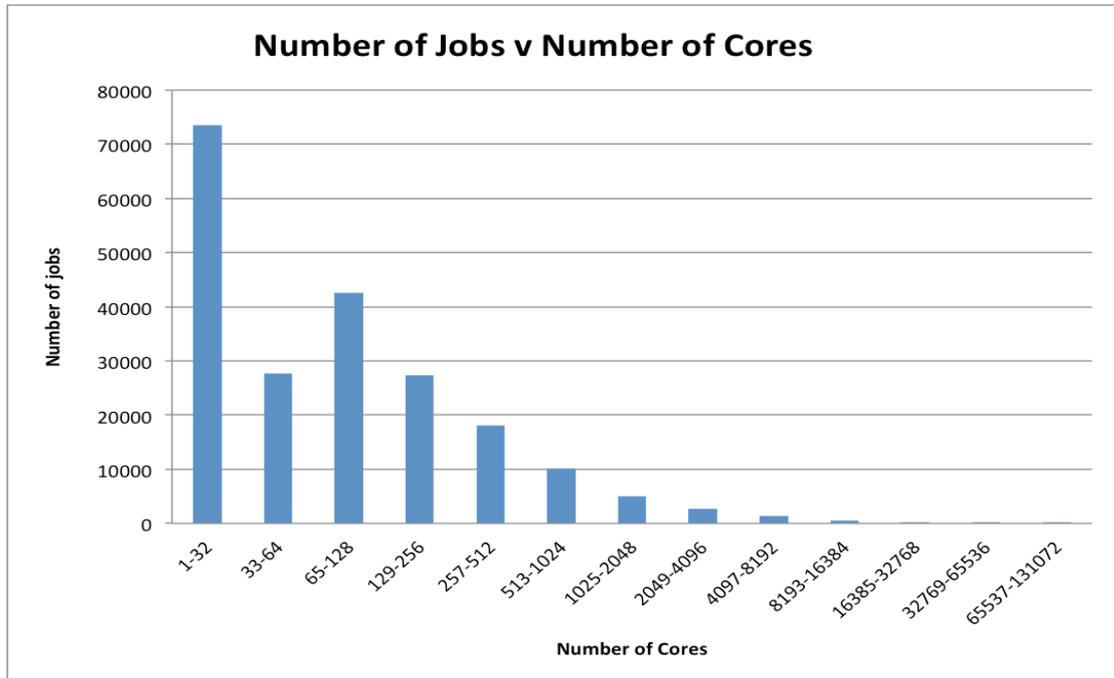
The colour in the matrix indicates the value of the Scheduling Coefficient. This is defined as the ratio of runtime to runtime plus wait time. Hence, a value of 1 (green) indicates that a job ran with no time waiting in the queue, a value of 0.5 (pale yellow) indicates a job queued for the same amount of time that it ran, and anything below 0.5 (orange to red) indicates that a job queued for longer than it ran.

The matrix shows that generally queuing times are short. The only cases where longer wait times than runtimes are encountered are either for very short jobs (as there is always a scheduling overhead) or for very large jobs (where the system has to drain compute nodes to make space for the jobs).

3.3 Additional Usage Graphs

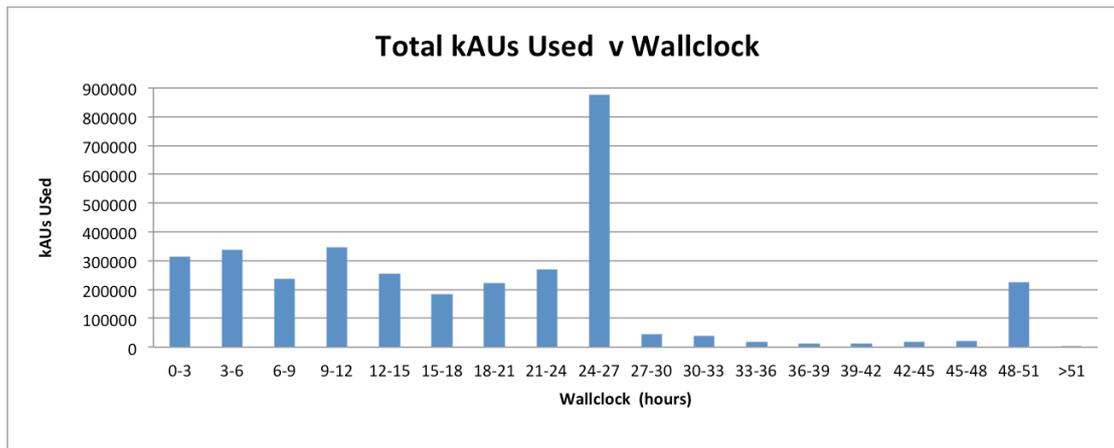
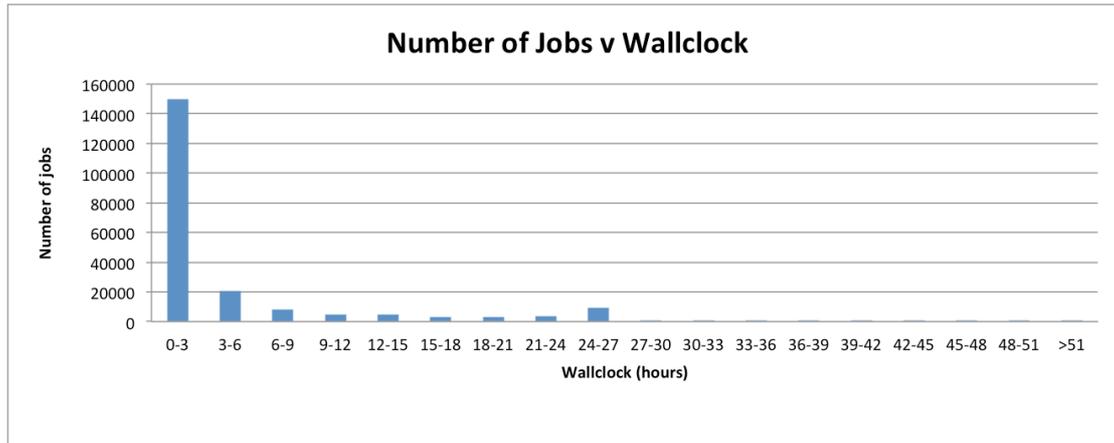
The following charts provide different views of the distribution of job sizes on ARCHER.

Number of Cores



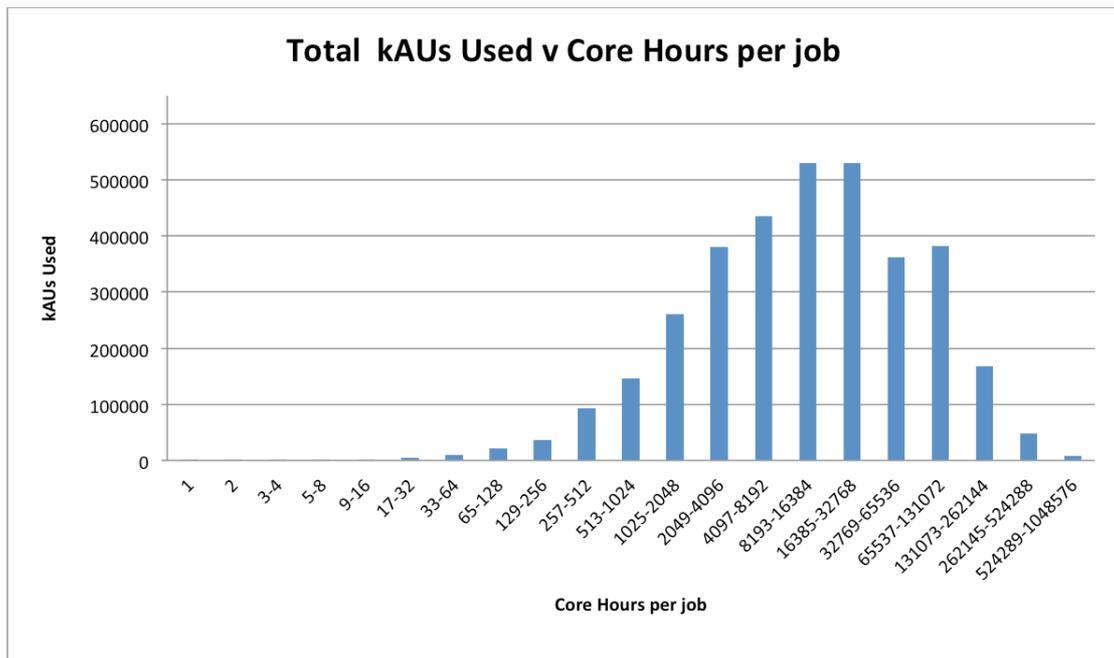
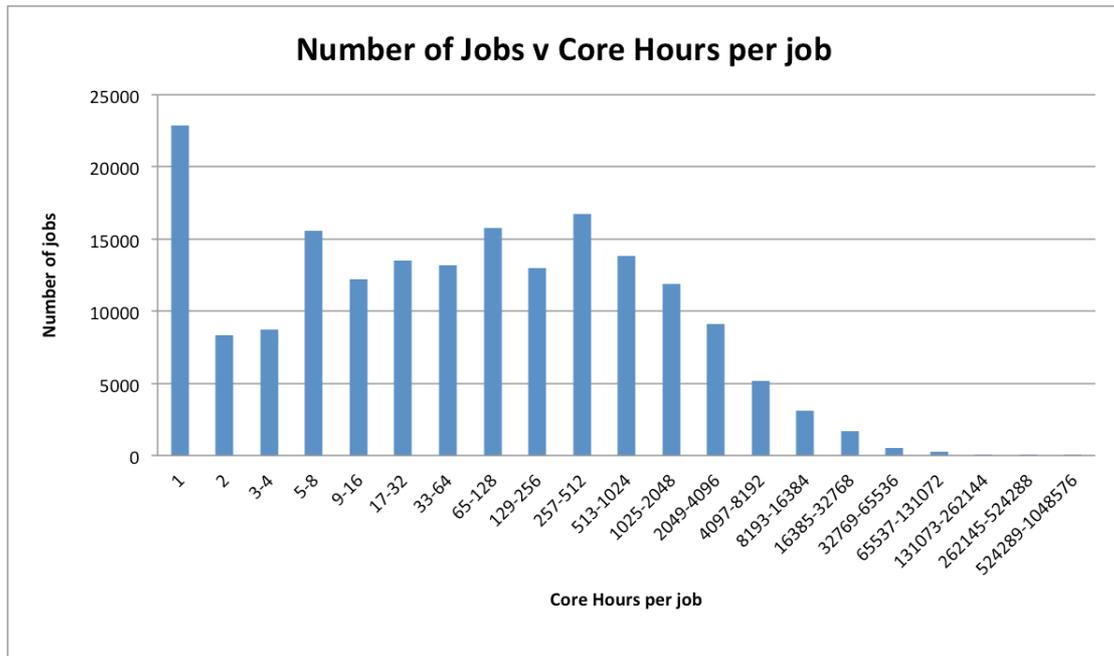
The first graph shows that, in terms of numbers, there is a significant number of jobs using no more than 512 cores. However, the second graph shows that most of the kAUs were spent on jobs between 257 cores and 8192 cores. The number of kAUs used is closely related to money and shows better how the investment in the system is utilised.

Wallclock



From the first graph, it would appear that the system is dominated by short jobs. However, the second graph shows that actual usage of the system is dominated by jobs of more than 24 hours.

Core Hours



The above graphs show that, while there are quite a few jobs that use only a small number of core hours per job, most of the resource is consumed by jobs that use tens of thousands of core hours per job.