



ARCHER SP Service Quarterly Report

Quarter 4 2015



Document Information and Version History

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1. The Service

1.1 Service Highlights

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

October 2015, November 2015, December 2015

- Utilisation on the system during 15Q4 was 88%, the same as in 15Q3.
- The remaining tasks required to return to normal after the Sonexion Lustre file system issues were completed successfully this quarter:
 - The disk replacement programme completed on 22nd October. The disk failure rate has returned to the levels that would be expected after the replacements.
 - Raidcheck was returned to running on a monthly schedule with the session advertised on the ARCHER public calendar, minimising the disruption to users compared to the weekly schedule that Raidcheck was previously running on.
 - EPSRC's contractor carried out a lessons learned review, with staff from EPCC contributing fully and constructively to the discussion and to the report. Recommended actions are being reviewed, and where appropriate, implemented, with the effects of any changes being monitored.
 - The normal cycle of patching and upgrades had had to be postponed until the resolution of the file system issues; this has now recommenced.
- The much-postponed CLE upgrade was successfully carried out on 11 November, bringing ARCHER up to version CLE 5.2. This is facilitating the completion of actions dependent on the CLE upgrade, in addition to providing the new features and fixes included. Advice and assistance was provided to users before and after the upgrade to assist them with actions required following the upgrade (such as recompiling applications and verifying output).
- Cray replaced cables in the high speed network infrastructure on 3 and 4 November 2015 to optimize the network speed and transfer performance;
- Cray is investigating an issue where multiple eslogin nodes are randomly hanging. Diagnosis has been hampered by the malfunctioning of kdump, the tool to enable a memory dump to be taken, for which a fix has been installed by the Service Provider on 9th December. A further required change to increase the kdump partition is scheduled to be implemented by the Service Provider during the maintenance session on 27th January.
- There have been a number of PBS-related issues that the Service Provider has raised with Cray and which Cray are working on in conjunction 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. Work to date looks promising.
- In conjunction with EPSRC and the CSE team, benefits realisation measurement for the ARCHER service continues. The metrics used to measure the benefits have been reviewed and adjusted to ensure the chosen metrics are both measurable and meaningful. The aim is to ensure that the optimal metric set present an accurate and consistent view on the benefits provided.

1.2 Forward Look

- RSIP node implementation will allow the use of applications requiring license servers on the compute nodes, for example, compilers and ISV applications. RSIP can be used to provide

licenses to the compute nodes for the commercial CFD software STAR-CCM+ from CD-Adapco. Following the successful CLE upgrade, the implementation is anticipated to be 24th February;

- A quarterly round-table discussion between all parties involved in delivering the ARCHER services will be added to the current quarterly review, with EPSRC, Cray and EPCC to discuss shared issues, exchange views and suggest actions to contribute to a programme of continuous improvement .
- Work is commencing to prepare the national service for ISO9000 certification, to further formalise the improvement mechanisms for service delivery and process improvement, with a key measurement being user satisfaction.

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	Oct 15		Nov 15		Dec 15		15Q4
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	99.2%	-2	96.6%	1	99.8%	-2	-3
2.6.4 – UR	1 WD	0	1 WD	0	1 WD	0	0
Total		-7		-4		-7	-18

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. Details of planned maintenance session can be found in Section 2.3.2.

2.1.3 Service Credits

As the Total Service Points are negative (-18), no Service Credits apply in 15Q4.

2.2 Detailed Service Level Breakdown

2.2.1 Phone Response (PR)

	Oct 15	Nov 15	Dec 15	15Q4
Phone Calls Received	28 (7)	27 (3)	37 (4)	92 (14)
Answered 2 Minutes	28	27	37	92
Service Level	100.0%	100.0%	100.0%	100.0%

The volume of telephone calls remained low in 15Q4. Of the total of 92 calls received above, only 14 were genuine ARCHER user calls that either resulted in queries or answered user questions directly.

2.2.2 Query Closure (QC)

	Oct 15	Nov 15	Dec 15	15Q4
Self-Service Admin	637	503	430	1564
Admin	197	263	141	601
Technical	20	56	21	87
<i>Total Queries</i>	848	812	592	2252
<i>Total Closed in 2 Days</i>	841	784	591	2216
Service Level	99.2%	96.6%	99.8%	98.4%

The above table shows the queries closed by SP during the period. The figures for November include 10 tickets which could not be processed whilst the RDF was unavailable between 9th and 12th of November due to power issues. Had those tickets been able to be processed, the service level percentage for November would have been 97.8%.

In addition to the Admin and Technical queries, the following Change Requests were resolved in 15Q4.

	Oct 15	Nov 15	Dec15	15Q4
Change Requests	0	5	0	5

2.2.3 User Registration (UR)

	Oct 15	Nov 15	Dec 15	15Q4
No of Requests	120	89	98	302
Closed in One Working Day	120	89	98	302
Average Closure Time (Hrs)	0.6	1.0	0.6	0.7
Average Closure Time (Working Days)	0.1	0.1	0.1	0.1
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:

	Oct 15	Nov 15	Dec 15	15Q4
CRAY	8	9	5	22
ARCHER_CSE	133	151	81	365
ARCHER_SP	1371	1229	960	3560
Total Queries Assigned	1512	1389	1046	3947
Total Assigned in 1 Hour	1512	1389	1046	3947
Service Level	100%	100%	100%	100%

The Service Desk assigns queries to all groups supporting the service i.e. SP, CSE and Cray. The above table includes queries handled by the other groups supporting the service as well as internally generated queries used to manage the operation of the service.

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
14/10/15	09:00	17:00	08:00	Pre-Approved	EPSRC Approved 0900 - 1700	SMW upgrade in preparation for CLE upgrade
11/11/15	09:00	17:20	08:20	Pre-Approved	EPSRC Approved 0900 - 1900	CLE 5.2 upgrade

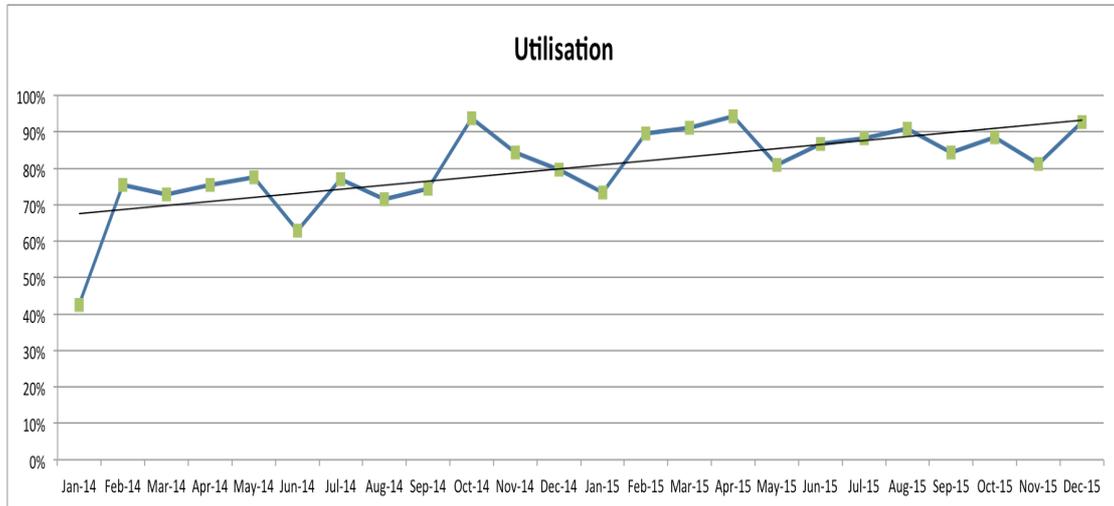
The planned maintenance on 14/10/15 over-ran into unplanned service downtime (until 1756) owing to technical issues where the responsibility lay with Cray. EPCC handed responsibility back to them when it was plain the service could not be brought back by 1700.

3. Service Statistics

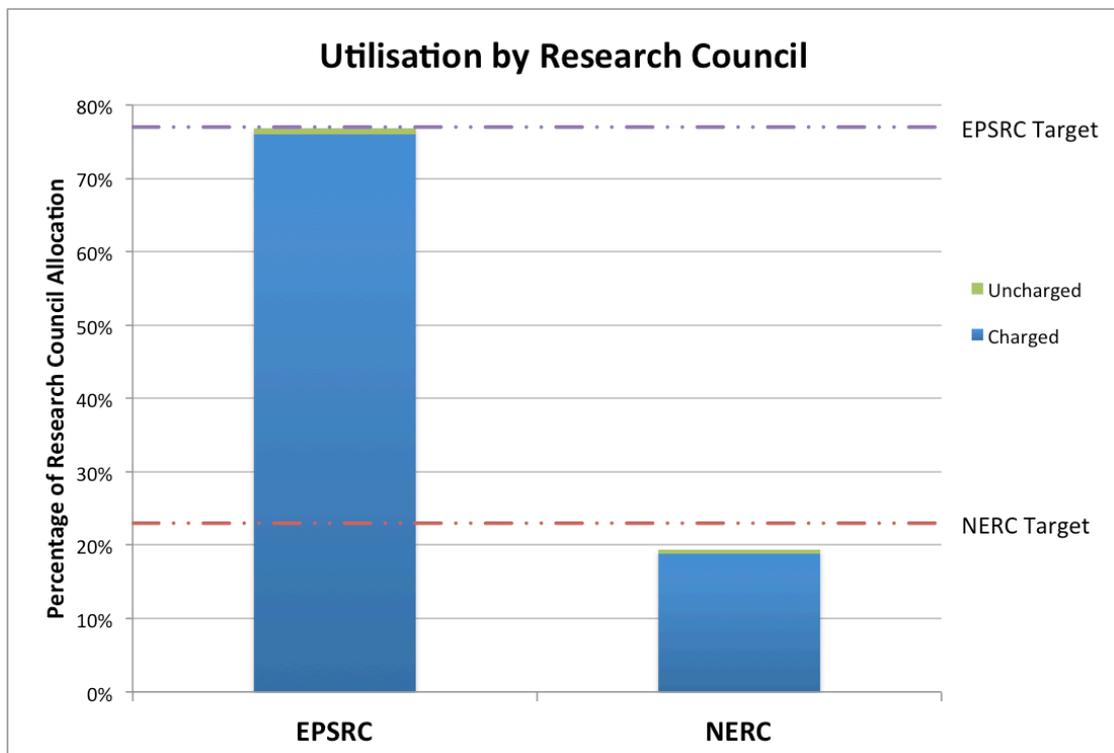
This section contains statistics on the ARCHER service as requested by EPSRC, SAC and SMB.

3.1 Utilisation

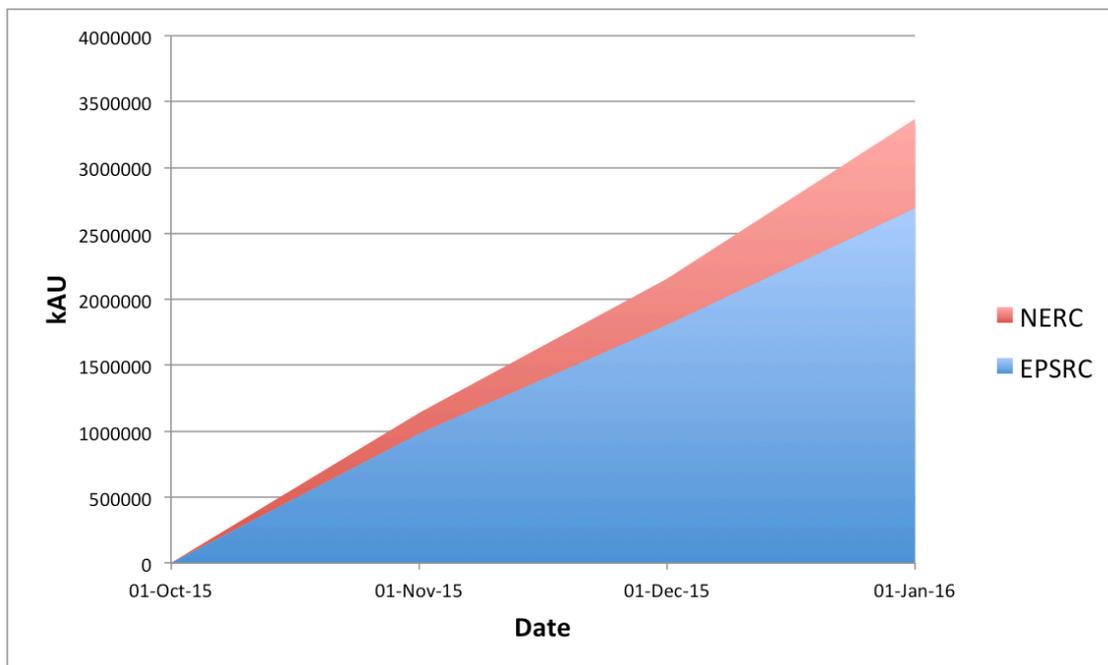
Utilisation over the quarter was 88%. A trendline has been added to the graph.



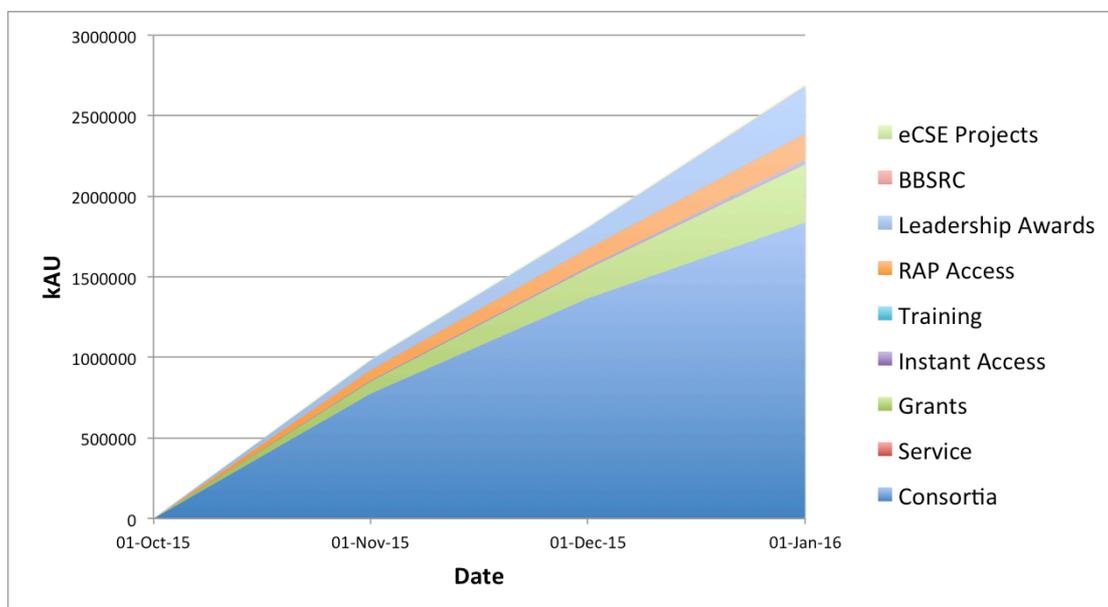
The utilisation by the Research Councils, relative to their respective allocations, is presented below. This bar chart shows the usage of ARCHER by the two Research Councils presented as a percentage of the total Research Council allocation on ARCHER.



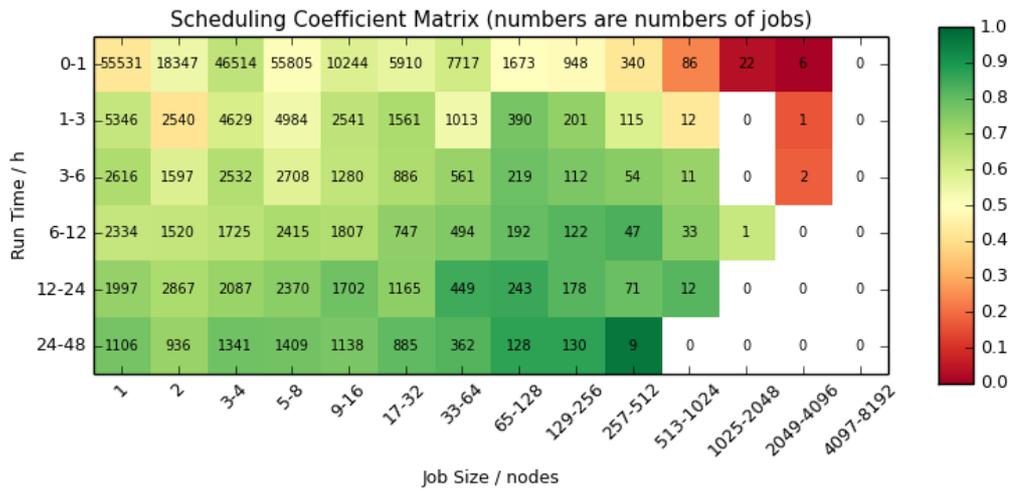
The cumulative allocation utilisation for the quarter by the Research Councils is shown below:



The cumulative allocation utilisation for the quarter by EPSRC broken down by different project types (see below) shows that the majority of usage comes from the scientific consortia (as expected) with significant usage from research grants, ARCHER Leadership projects and ARCHER RAP projects. The times used by Instant Access projects, training projects and general service usage are very small.



3.2 Scheduling Coefficient Matrix



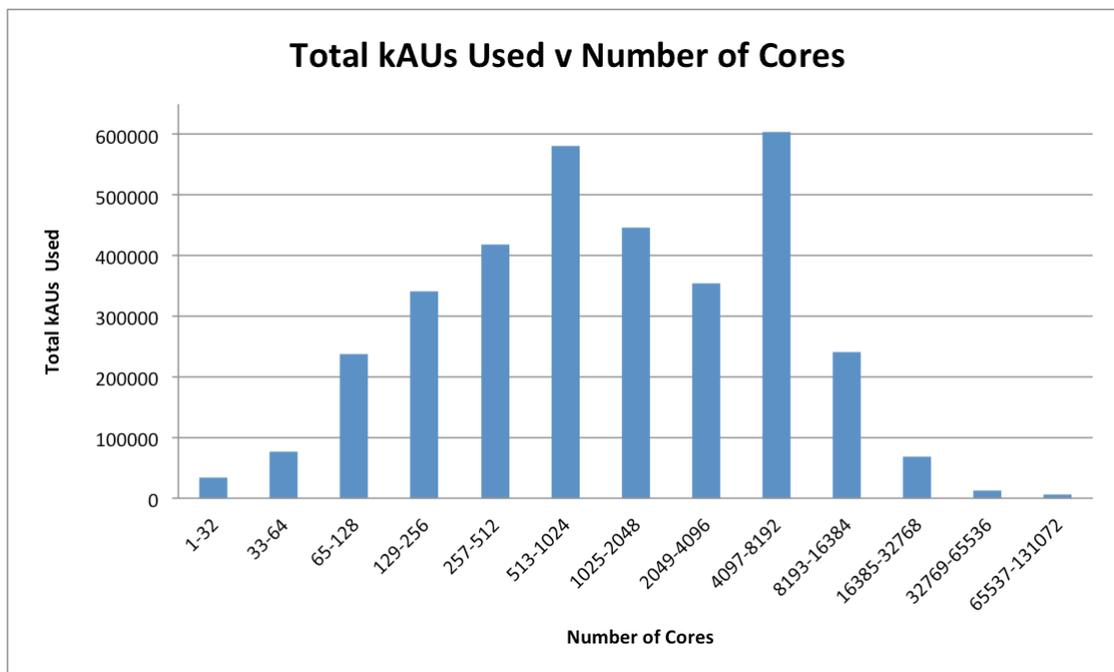
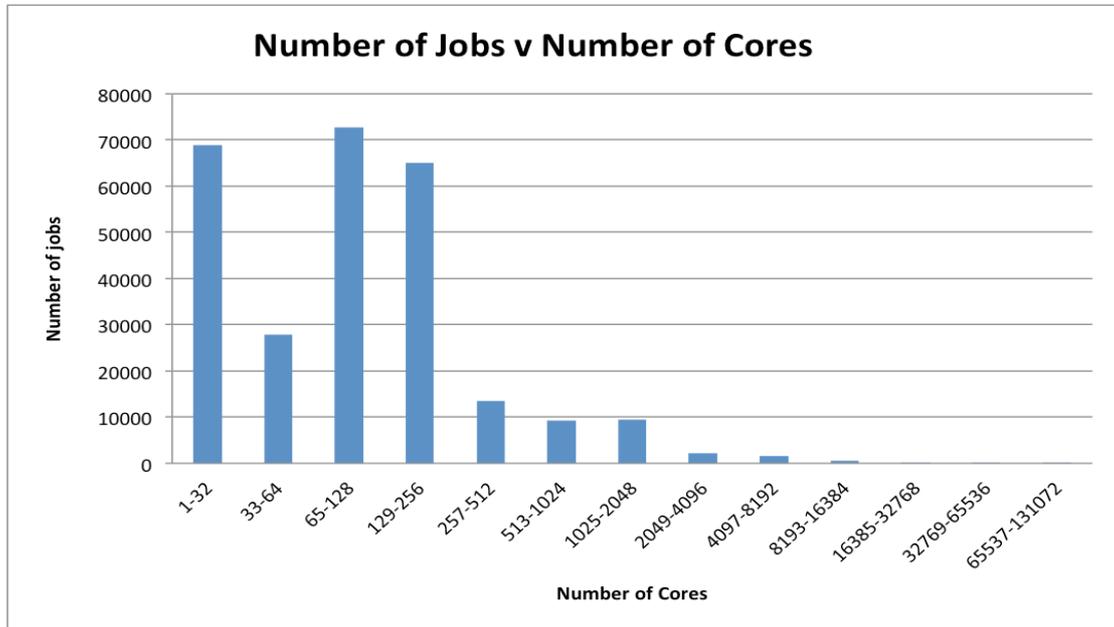
The colour in the matrix indicates the value of the Scheduling Coefficient. This is defined as the ratio of runtime to runtime plus wait time. Hence, a value of 1 (green) indicates that a job ran with no time waiting in the queue, a value of 0.5 (pale yellow) indicates a job queued for the same amount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

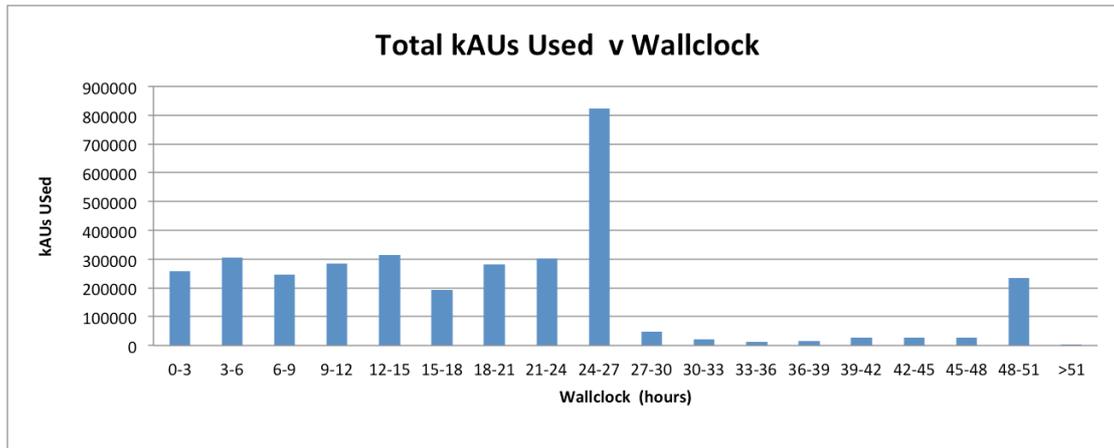
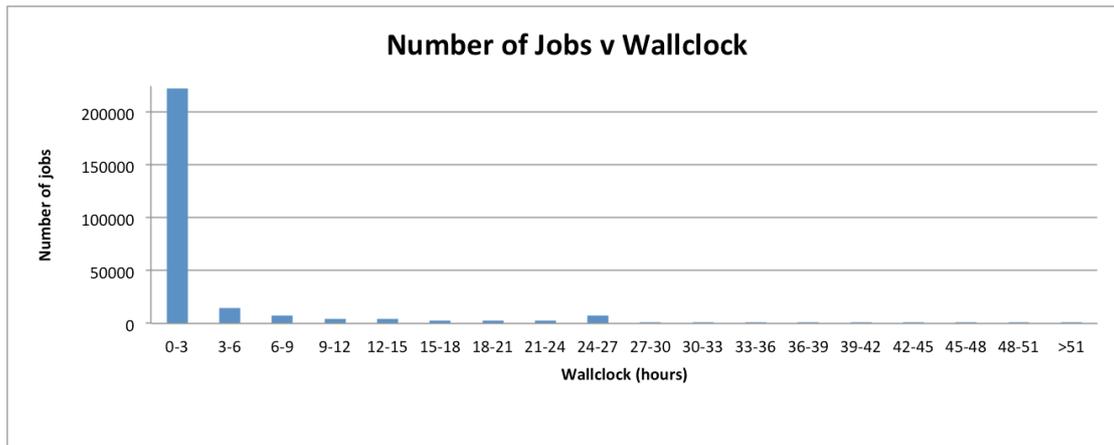
The following charts provide different views of the distribution of job sizes on ARCHER.

Number of Cores



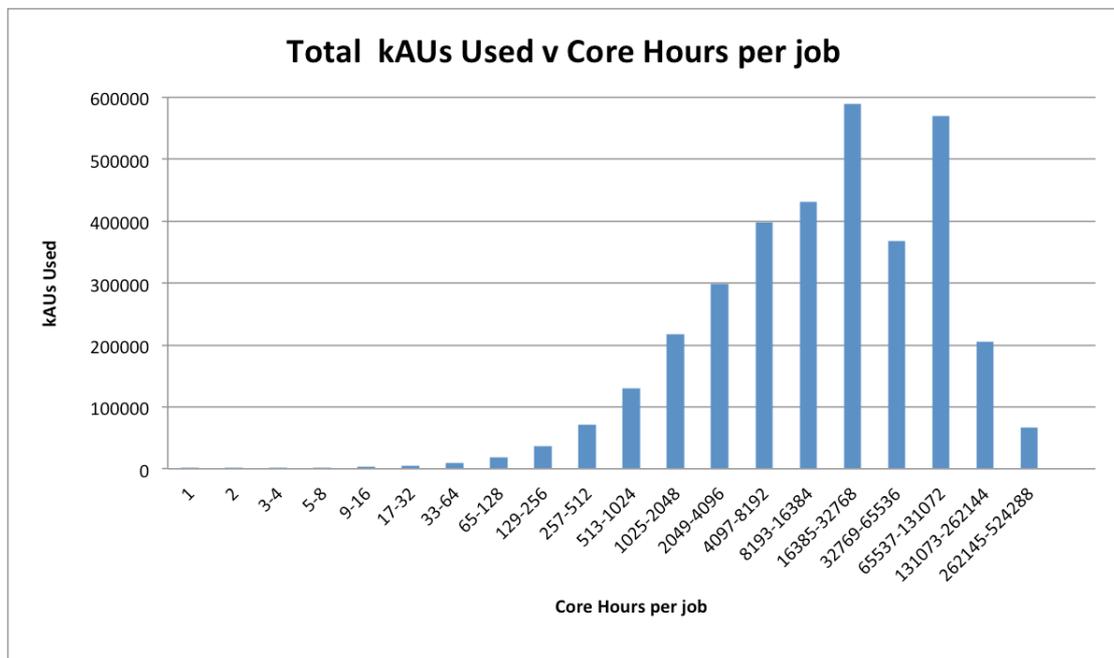
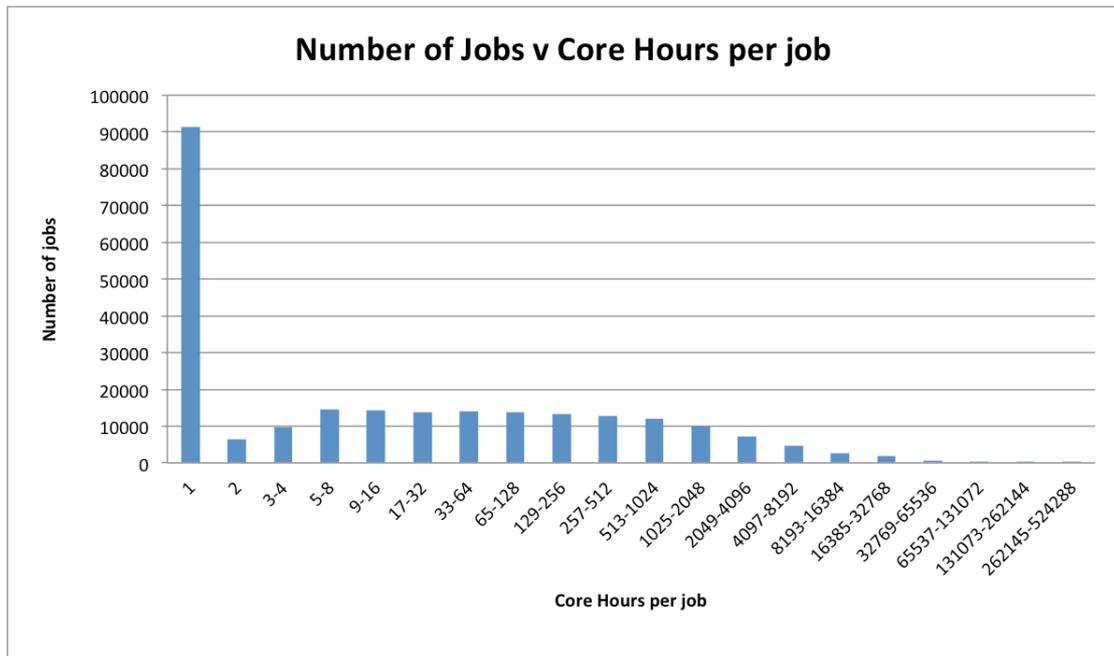
The first graph shows that, in terms of numbers, there is a significant number of jobs using no more than 512 cores. However, the second graph reveals that most of the kAUs were spent on jobs between 257 cores and 8192 cores. The number of kAUs used is closely related to money and shows better how the 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 more spread and dominated by jobs of less than or equal to 27 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.