



ARCHER SP Service Quarterly Report

Quarter 1 2016



Document Information and Version History

Version:	1.0
Status	Final
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Reviewer(s)	Alan Simpson

Version	Date	Comments, Changes, Status	Authors, contributors, reviewers
0.1	29/03/16	Initial Draft	Anne Whiting
0.2	11/04/16	Updated	Anne Whiting
0.3	15/04/16	Completion of graphs	Anne Whiting
0.4	17/04/16	Review	Andy Turner
0.5	19/04/16	Updates post review	Anne Whiting
0.6	19/04/16	Final review	Alan Simpson
1.0	19/04/16	Final version for EPSRC	Alan Simpson, Anne Whiting

1. The Service

1.1 Service Highlights

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

January 2016, February 2016 and March 2016

- Utilisation on the system during 16Q1 was 96% as opposed to 88% in 15Q4 and 85% in 15Q1. It is very positive to see the demand for the service being so high and this should add to the business case for continuation of the national service. The high utilisation was primarily due to the volume of jobs submitted by NERC to meet their end of allocation period deadline of 31/03/16. This had a significant impact on queuing times for all users as can be seen from the reduction in the mean scheduling coefficient from 0.56 in 15Q4 to 0.41 for this quarter i.e. the average queueing time for this quarter was circa 1.5 times the run time.
- The number of responses to the ARCHER user survey was up from 153 in 2014 to 230 in 2015. The feedback was very positive, with the mean score for overall satisfaction being 4.3 (on a scale of 1 (unsatisfactory) to 5 (excellent)). Only two mentions were made of the filesystem problems. The helpdesk feedback was very favourable with a mean score of 4.5. Five lucky winners have been selected randomly from the users who replied to the survey and will be offered a prize of either 2000 KAUs on ARCHER, or a £10 donation to Save the Children.
- Changes to the job scheduler resulted in major improvements to scheduling cycle times. Comparing jobs run in training course run in 2015 in Southampton with an equivalent course run since the scheduler changes under the same conditions demonstrates the positive impact of the changes. In 2015 on the course there was a queue of 1000 non-course jobs and it was almost impossible to get the course jobs to run, causing attendee complaints. The recent and equivalent 2016 course had 1500 non-course jobs queued but the training course jobs were processed quickly without any delay and without complaints.
- Work has commenced to prepare the national service for ISO 9000 certification, to further formalise the improvement mechanisms for service delivery and process improvement, with the key measurement being user satisfaction. User satisfaction will be tracked through a range of measures including the user survey, query feedback, user and consortia meetings and outreach events. The plan is to hold the certification audit in December 2016.
- New functionality has been introduced to the SAFE to facilitate the easy sign up of users to applications such as VASP and CASTEP. This speeds up the process for users applying for access to licensed software on ARCHER, and also provides the option of linking automating access to particular licensed software for particular user groups e.g. all new NCAS users would get automatic access to the Unified Model when their account is set up.
- The module defaults have been updated applying bug fixes and providing access to new features.
- SP staff helped organise the inaugural ARCHER Champions meeting and gave very informative tours of ARCHER and the facilities at the ACF. The user feedback for the meeting and the tours was very positive, and the attendees were enthusiastic about the remit and future of the ARCHER Champions.

1.2 Forward Look

- Functionality to monitor applications usage is being introduced following successful testing on the TDS. XALT monitors the compilers, libraries and other software that users need and will help improve the support and configuration of the applications that ARCHER users run.
- The experience and feedback from running the first ARCHER Champions workshop will be used to create a programme of future events with the involvement of the Champions group.
- A more user-friendly and modern user interface to the SAFE has been developed and is currently being tested. This is something that the users have requested and it will soon be rolled out to the user community for their feedback.

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	99.3%	-2	99.7%	-2	100.0%	-2	-6
2.6.4 – UR	1 WD	0	1 WD	0	1 WD	0	0
Total		-7		-7		-7	-21

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 sessions can be found in Section 2.3.2.

2.1.3 Service Credits

As the Total Service Points are negative (-21), no Service Credits apply in 16Q1.

2.2 Detailed Service Level Breakdown

2.2.1 Phone Response (PR)

	Jan 16	Feb 16	Mar 16	16Q1
Phone Calls Received	24	25	33	82
Answered 2 Minutes	24	25	33	82
Service Level	100.0%	100.0%	100.0%	100.0%

The volume of telephone calls remained low in 16Q1. Of the total of 82 calls received above, only 23 were genuine ARCHER user calls that either resulted in queries or answered user questions directly.

2.2.2 Query Closure (QC)

	Jan 16	Feb 16	Mar 16	16Q1
Self-Service Admin	481	530	496	1507
Admin	174	180	172	526
Technical	24	17	25	66
<i>Total Queries</i>	679	727	693	2099
<i>Total Closed in 2 Days</i>	674	725	693	2092
Service Level	99.3%	99.7%	100.0%	99.7%

The above table shows the queries closed by SP during the period. The query closure metric for March of 100% was particularly good.

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

	Jan 16	Feb 16	Mar 16	16Q1
Change Requests	2	0	0	2

2.2.3 User Registration (UR)

	Jan 16	Feb 16	Mar 16	16Q1
No of Requests	136	100	102	338
Closed in One Working Day	136	100	102	338
Average Closure Time (Hrs)	0.6	0.5	0.6	0.6
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:

	Jan 16	Feb 16	Mar 16	16Q1
CRAY	6	13	8	27
ARCHER_CSE	130	145	141	416
ARCHER_SP	1211	1240	1558	4009
Total Queries Assigned	1347	1398	1707	4452
Total Assigned in 1 Hour	1347	1398	1707	4452
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.

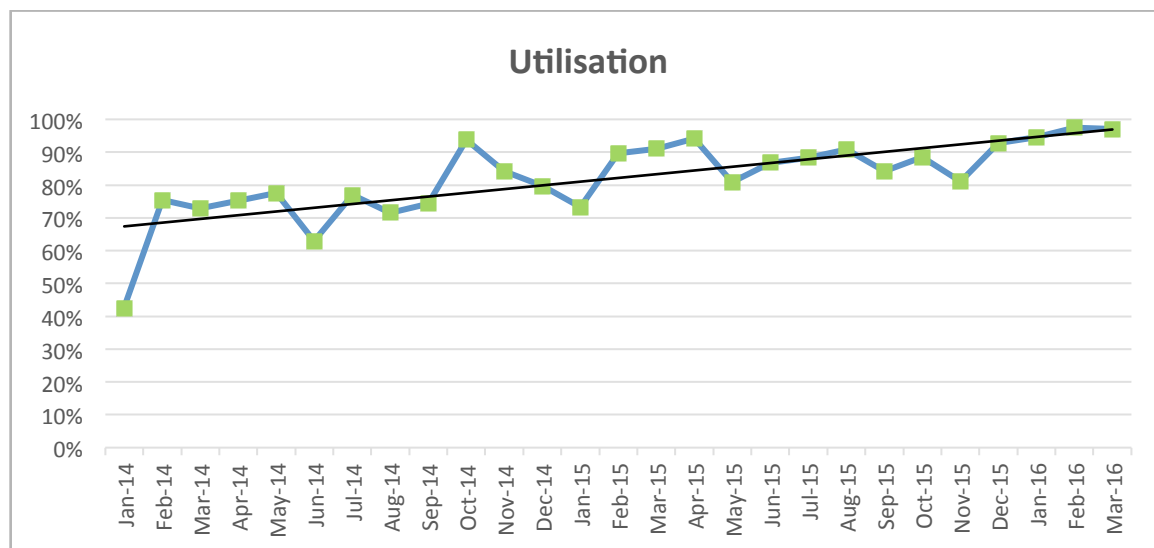
Date	Start	End	Duration	Type	Notes	Reason
27/01/16	09:00	15:43	06:43	Pre-Approved	EPSRC Approved 0900 - 1700	Scheduler changes and field notices

3. Service Statistics

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

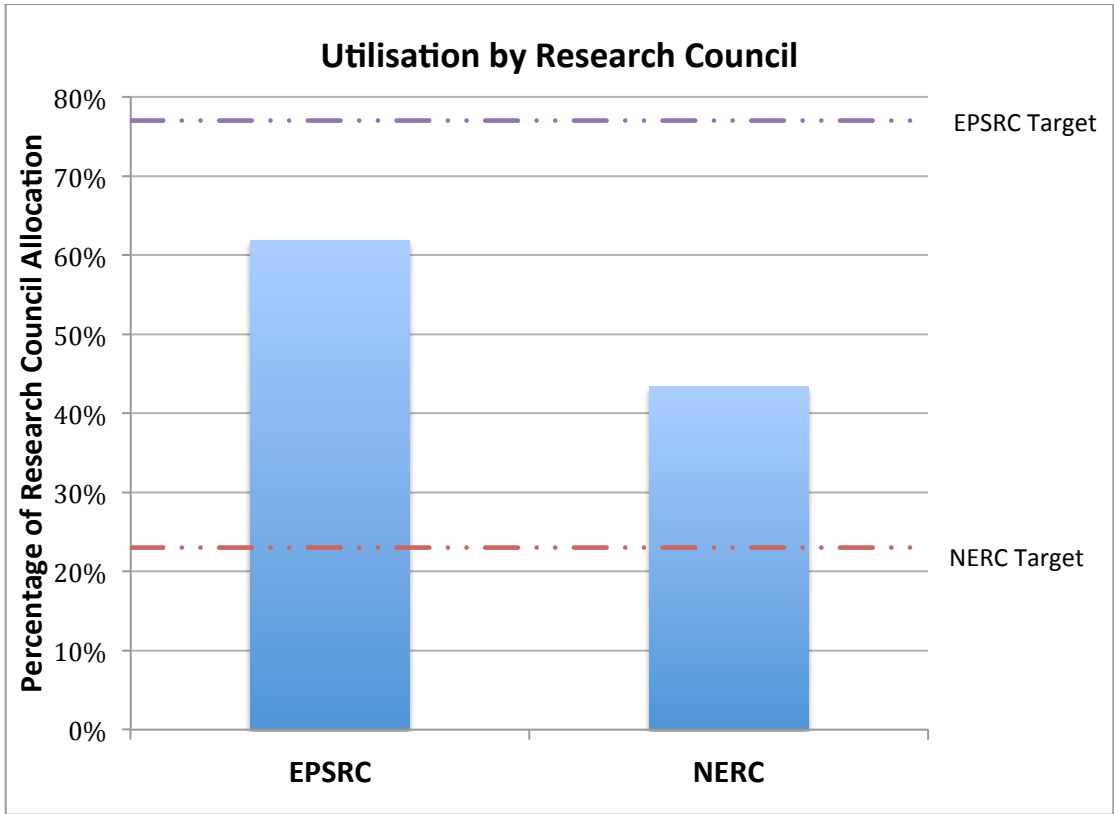
3.1 Utilisation

Utilisation over the quarter was 96%. The plot below shows a steady increase in utilisation over the lifetime of the service to date:

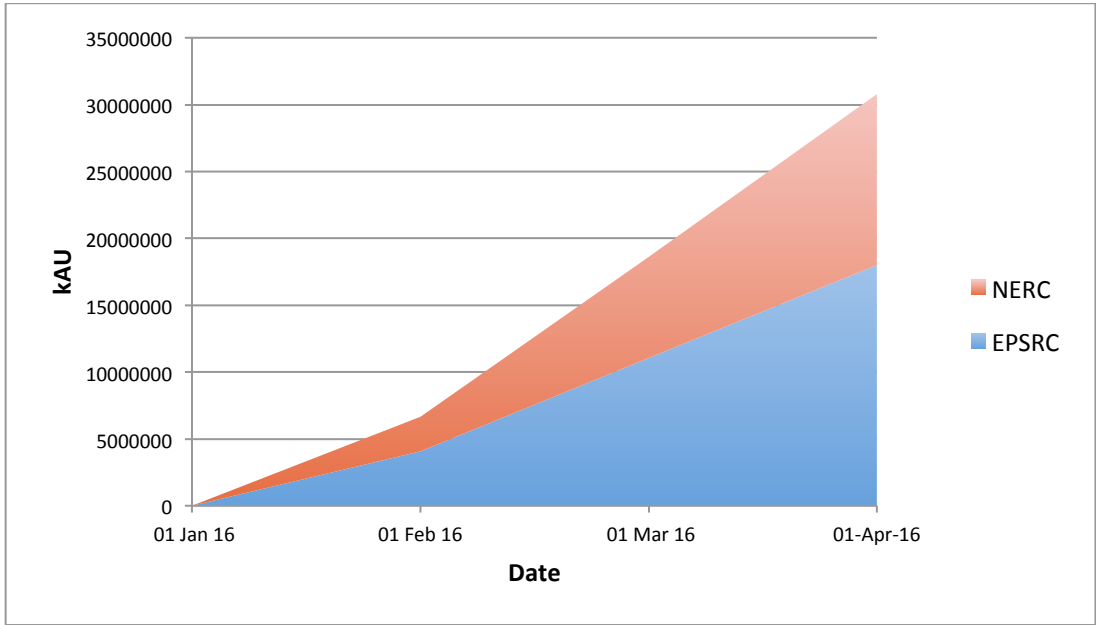


The utilisation by the Research Councils, relative to their respective allocations, is presented below. This bar chart shows the usage of ARCHER by the two Research Councils presented as a percentage of the total Research Council allocation on ARCHER. The NERC consortia had an allocation end date of 31/03/16 and submitted a large number of jobs to beat this deadline. NERC utilisation was 44% for this quarter, but 24% over the year April 2015 to March 2016. EPSRC utilisation was 62% for this quarter and 61% for the year April 2015 to March 2016.

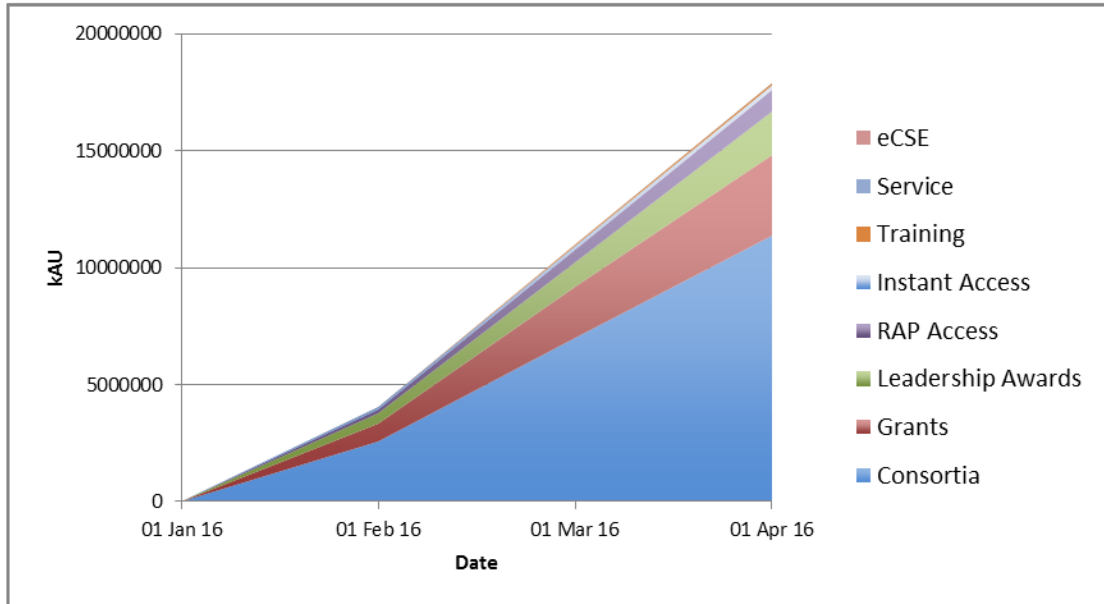
For this quarter the combined percentage of Research Council allocations adds up to more than 100% of their total allocation because the Research Councils used some of the 10.5% of the time allocated to other parties (e.g. PRACE). There were a significant number of reservations this quarter which are charged at 1.5 times the normal rate leading to NERC being charged for 11,165KAUs more than they used.



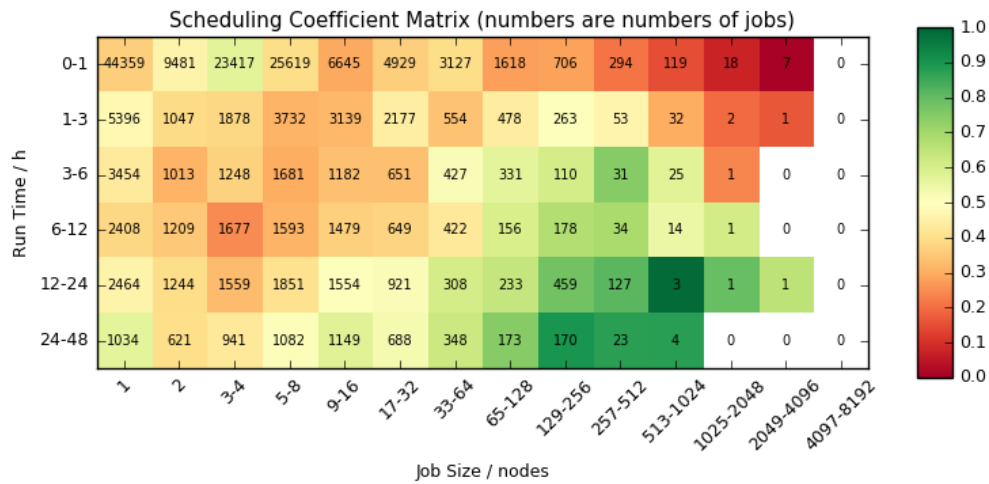
The cumulative allocation utilisation for the quarter by the Research Councils is shown below:



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

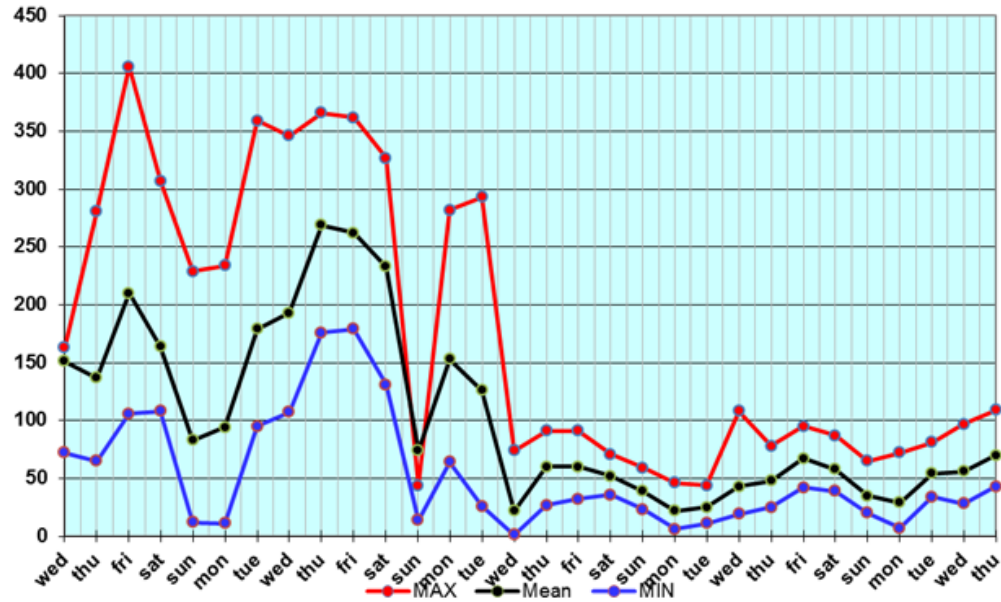


The colour in the matrix indicates the value of the Scheduling Coefficient. This is defined as the ratio of runtime to runtime plus wait time. Hence, a value of 1 (green) indicates that a job ran with no time waiting in the queue, a value of 0.5 (pale yellow) indicates a job queued for the same amount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

Comparing with the previous Quarter, the matrix shows that queuing times have been typically longer this quarter. The machine has been noticeably busier with a mean scheduling coefficient of 0.41 for this quarter as compared to 0.56 in 4Q15. This quarter, the NERC end of allocation date was 31st March 2016 and NERC submitted a large number of jobs to meet this deadline.

Scheduling Cycle Times

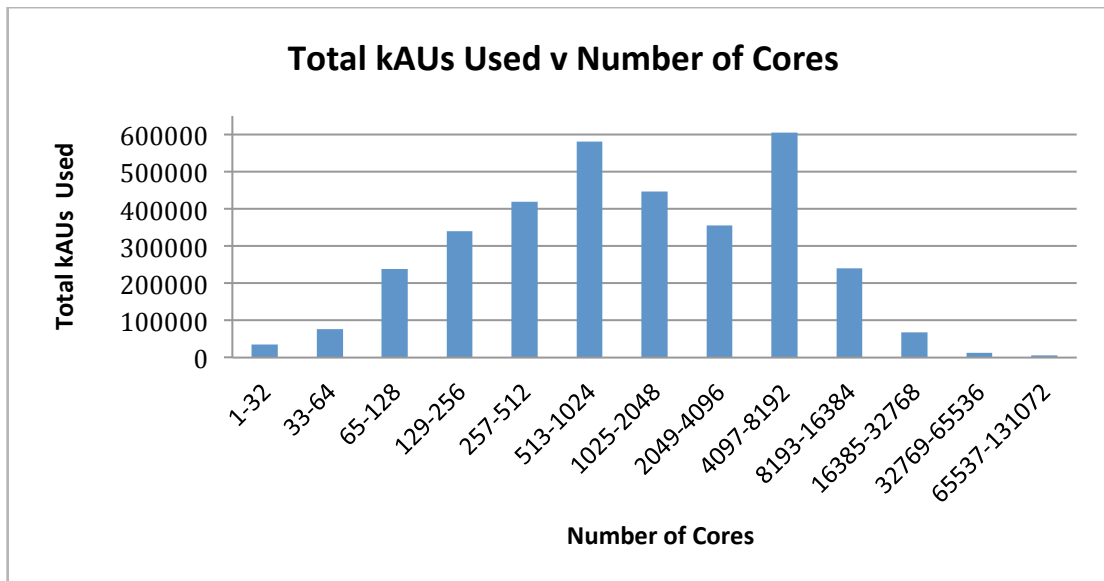
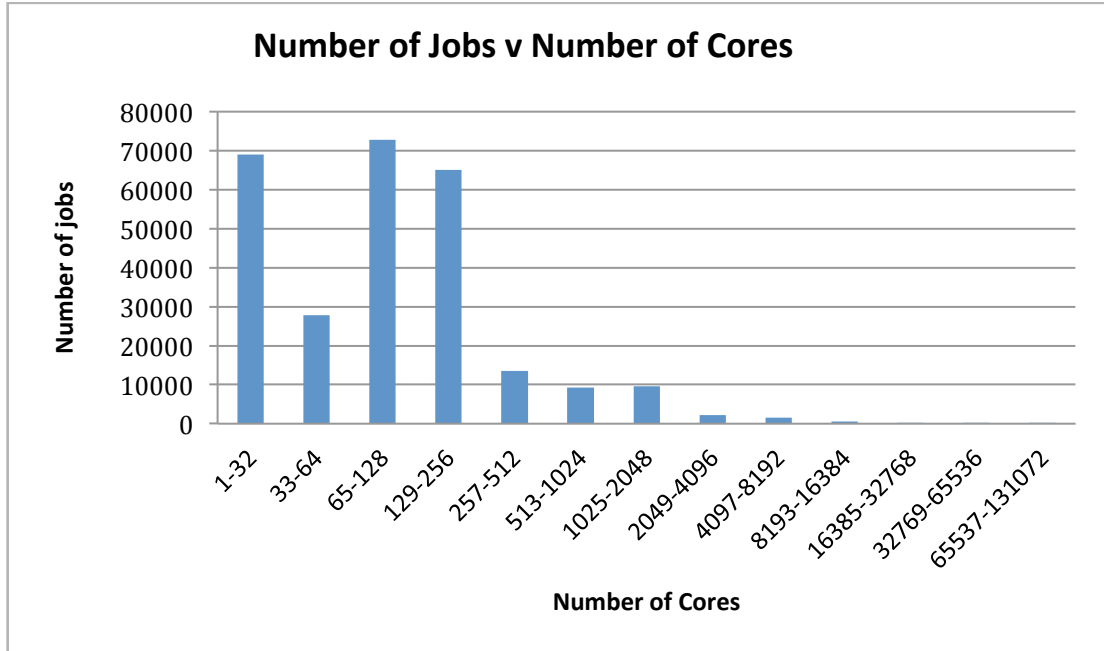
The graph below shows significant improvements in scheduling cycle times resulting from changes made to the scheduler. The graph shows maximum (red), mean (black) and minimum (blue) scheduling cycle times (in seconds) for the two weeks before the change on Wednesday 27/01/16 and the two weeks after the change.



3.3 Additional Usage Graphs

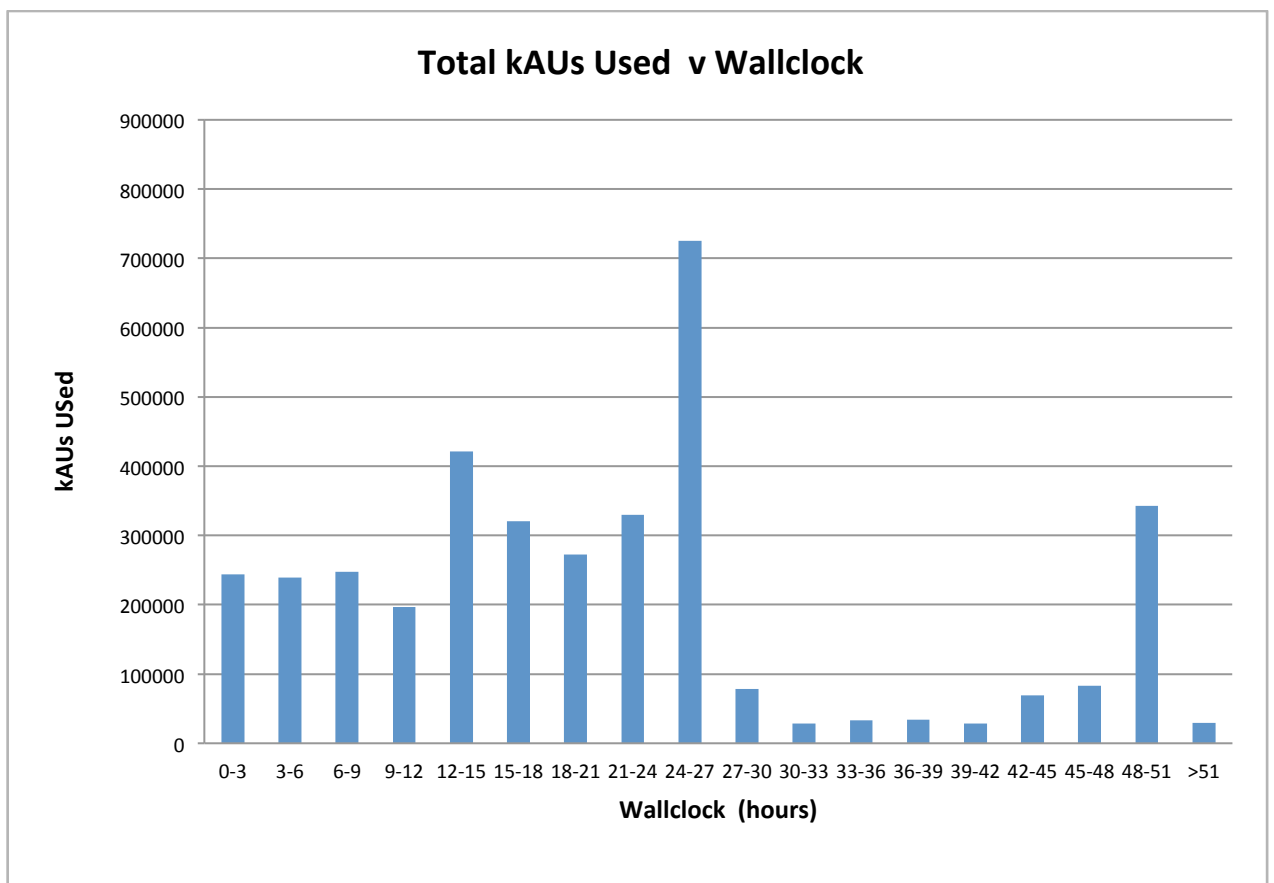
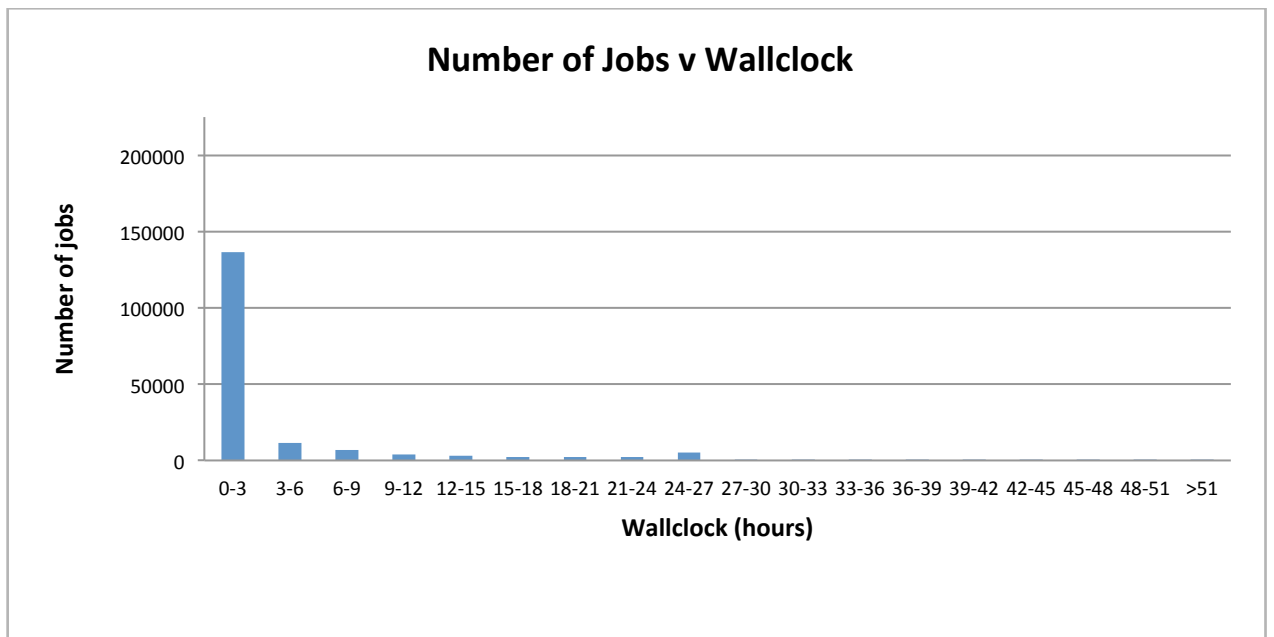
The following charts provide different views of the distribution of job sizes on ARCHER.

Analysis of Job Sizes



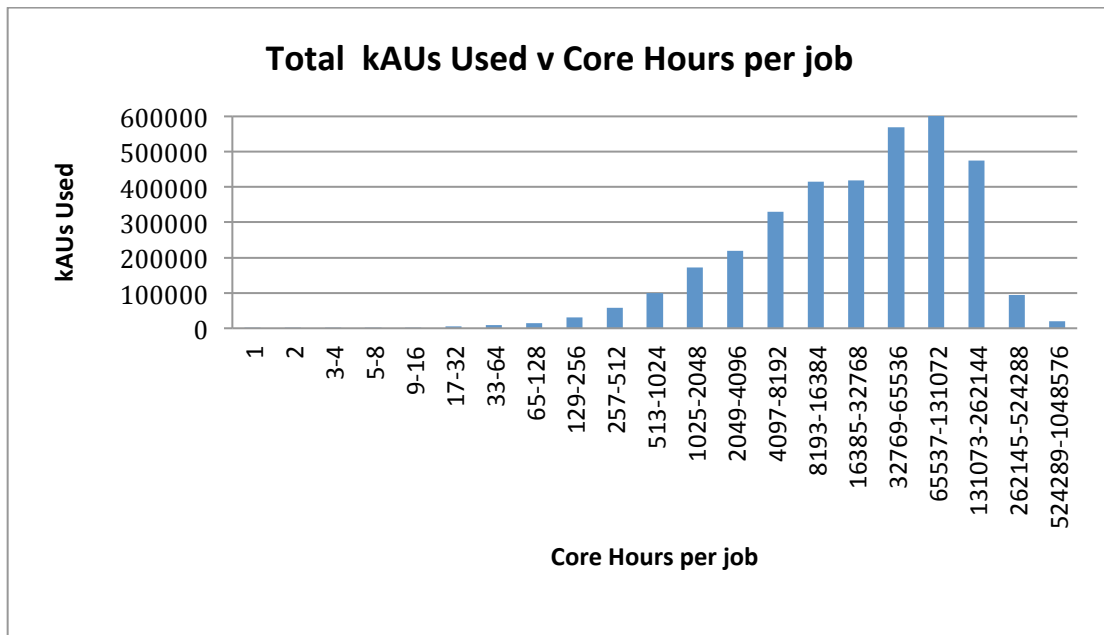
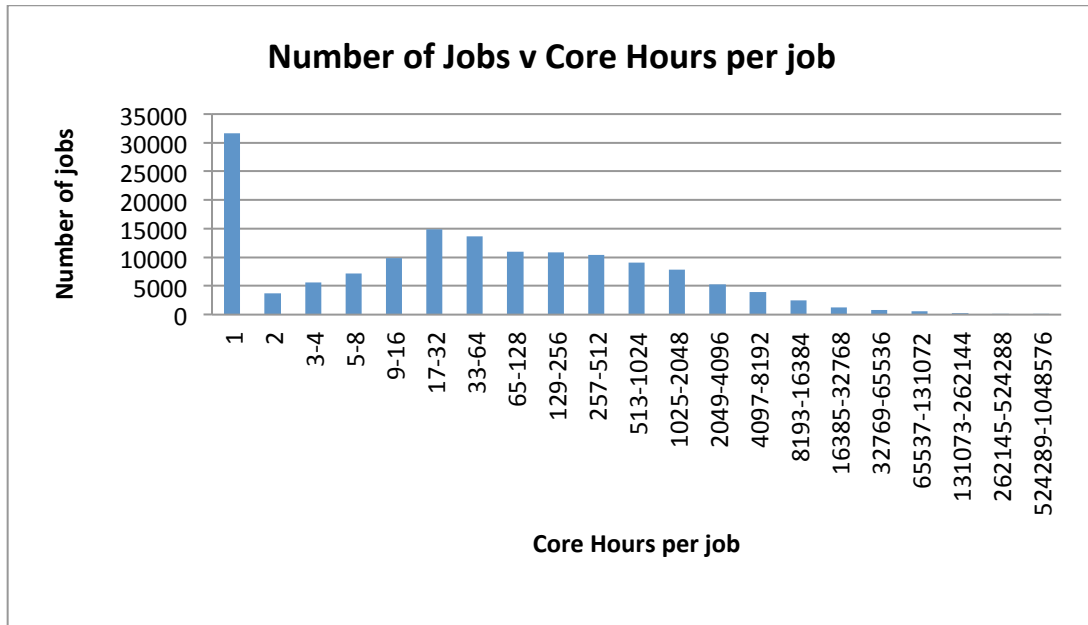
The first graph shows that, in terms of numbers, there are a significant number of jobs using no more than 256 cores. However, the second graph reveals that most of the kAUs were spent on jobs between 257 cores and 8192 cores. The number of kAUs used is closely related to money and shows better how the investment in the system is utilised.

Analysis of Jobs Length



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 up to 27 hours.

Core Hours per Job Analysis



Appendix – Infrastructure report

The issues with Cray XC30 cabinets tripping supply-side breakers reported in the appendix to the 4Q15 report have not re-occurred since the replacement of the breakers. No other infrastructure related issues have occurred this quarter.