ARCHER SP Service Quarterly Report

Quarter 2 2018

Document Information and Version History

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0.1	19/06/18	Initial Draft	Anne Whiting
0.2	03/07/18	Quarterly figures added	Anne Whiting
0.3	07/07/18	Phone stats and graphs added	Jo Beech-Brandt
0.4	11/07/18	Cumulative usage graphs added	Anne Whiting
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1.0	13/07/18	Version for EPSRC	Alan Simpson

1. The Service

1.1 Service Highlights

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

April 2018, May 2018 and June 2018.

- Utilisation on the system during 18Q2 was 82%, as compared to 91% in 18Q1. The dip in utilisation experienced this quarter was thought to be related to allocation by EPSRC, and to counteract this EPSRC has issued additional allocations to the Consortia to be used in 2018.

- Having reviewed the comments made in the Annual user Survey 2017, the ARCHER Users appear to be consistently happy with the service, giving a mean overall score of 4.4. A number of the comments made have triggered investigations into potential improvements. These include:
    - A review of the website to identify potential improvements in structure and ease of navigation
    - A review of the mechanisms offered to users to provide feedback to ensure this is as easy as possible
    - An action to reinstate the search functionality on the website, which is currently underway

- At the suggestion of SAC (Scientific Advisory Committee), EPCC also analysed the responses to the Annual User Survey 2017 split by Research Council. The responses from EPSRC and NERC were generally very similar with few noticeable differences.

- Work is progressing well to prepare for the ISO27001 information security certification with the aim of certification in Autumn 2018. A risk management framework and data handling policies have been developed to ensure data is handled in accordance with its level of sensitivity. The processes already developed for our ISO9001 quality management system can be applied to our ISO27001 information security management system, thus providing consistency and best practice. A programme of internal audits is being rolled out to ensure policies are being adhered to and to identify further areas of improvement.

- SAFE and ARCHER privacy policies have been published to meet GDPR requirements. These policies provide the user community with the details of how EPCC handle their personal data and can be found at https://www.archer.ac.uk/about-archer/policies/.

- Staff have attended, and in many cases presented, at events including ISC, HPC-SIG and the Cray User Group, helping to ensure that ARCHER is well represented within the HPC Community and to facilitate knowledge sharing and best practice across the HPC Community.

- A refresh of the SAFE user interface has been implemented based on an in-depth internal review looking at the usability aspects of site. Almost all the major pages in the SAFE have been reviewed with a large number of small improvements to the content. Significant efforts have also been made to improve the overall navigation. Some redundant intermediate pages have been removed and a there is a greater use of hyper-links to allow rapid navigation between different parts of the site.

1.2 Forward Look

- The document review Stage 1 external audit for ISO27001 will take place in August 2018, with the full audit due in September 2018. Work will continue to prepare for the audit and subsequently to address any findings from it.

- The new version of PBS, 13.408, is being tested to ensure it does not adversely affect the service before upgrading. As well as providing new functionality, it should resolve issues that we have experienced where jobs that cannot run prevent other jobs being scheduled.

- An upgrade to the Sonnexion software which supports the work file system on ARCHER is being planned in order to ensure that the Sonnexions are at a level that will be fully supported until the end of the Archer service

- Cleaning of the computer room cooling towers in the ACF datacenter will be carried out in order to improve their efficiency, optimise cooling of ARCHER and to reduce running costs. Such cleaning as been implemented as an ongoing service improvement.

- A review of the power redundancy will be carried out on critical racks in the ARCHER computer room in order to prevent any further outages triggered by eslogin power supply failures.

- Plans are being finalised to upgrade the KNL system to CLE 6 UP04, which will enable the Meltdown patches to be applied to that system.

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	Apr 18		May 18		Jun 18		28Q1
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	99.0%	-2	98.9%	-2	97.6%	-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 unplanned outages where responsibility lies within the terms of the SP Contract.

Details of planned maintenance sessions, if any, 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 18Q2.

2.2 Detailed Service Level Breakdown

2.2.1 Phone Response (PR)

	Apr 18	May 18	Jun 18	28Q2
Phone Calls Received	12 (1)	21 (2)	27 (4)	**60 (7)**
Answered in 2 Minutes	12	21	27	**60**
Service Level	**100.0%**	**100.0%**	**100.0%**	**100.0%**

The volume of telephone calls remained low in 18Q2. Of the total of 60 calls received above, only 7 were actual ARCHER user calls that either resulted in queries or answered user questions directly.

2.2.2 Query Closure (QC)

	Apr 18	May 18	Jun 18	28Q2
Self-Service Admin	562	499	350	**1411**
Admin	111	118	89	**318**
Technical	13	24	22	**59**
Total Queries	686	641	461	**1788**
Total Closed in 2 Days	680	639	455	**1774**
Service Level	**99.1%**	**99.7%**	**98.7%**	**99.2%**

The above table shows the queries closed by SP during the period. It is worth noting that there was a significant drop in the number of self-service admin queries in February and March, mirroring a similar drop in the number of new users registered. Each user registration and new project creation creates multiple self-service admin queries.

In addition to the Admin and Technical queries, the following Change Requests were resolved in 18Q2:

	Apr 18	May 18	Jun 18	28Q2
Change Requests	0	1	0	**1**

2.2.3 User Registration (UR)

	Apr 18	May 18	Jun 18	28Q2
No of Requests	65	63	58	**186**
Closed in One Working Day	65	63	58	**186**
Average Closure Time (Hrs)	0.56	0.35	0.54	**0.48**
Average Closure Time (Working Days)	0.06	0.04	0.06	**0.05**
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.

2.3.1 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:

	Apr 18	May 18	Jun 18	28Q2
CRAY	5	6	3	**14**
ARCHER_CSE	87	107	74	**268**
ARCHER_SP	1006	919	734	**2659**
Total Queries Assigned	1098	1032	811	**2941**
Total Assigned in 1 Hour	1098	1032	811	**2941**
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

Maintenance now takes place on at most a single day each month (fourth Wednesday of each month). This is marked as a full outage maintenance session for a maximum of 8 hours taken. There is an additional "at-risk" session that is scheduled for the second Wednesday of each month. This reduces the number of outages taken, which then reduces user impact since the jobs running on the service have to be drained down only once per month and not twice. It also eases the planning for training courses running on ARCHER. A 6-month forward plan of maintenance has been agreed with EPSRC.

With the approval of EPSRC, to minimise service disruption and maximise responsiveness to user needs, the service is trialling a move to a weekly at-risk session during working hours rather than the current fortnightly at-risk or full maintenance schedule. At-risk sessions can still be converted into full maintenance sessions where strictly required with the appropriate notice and approvals. We will try this approach from July to September and consider making this change permanent if the impact and feedback are positive.

The following planned maintenance took place this quarter:

Date	Start	End	Duration	Type	Notes	Reason
27/07/18	0900	1238	3 hrs 28 mins	Full Outage	EPSRC Approved 0900 – 1700	Check of electrical components powering ARCHER-critical rack

2.3.3 Quality Tokens

Four quality tokens have been received during the quarter, all positive. This is a significant increase in quality tokens of any type from recent quarters.

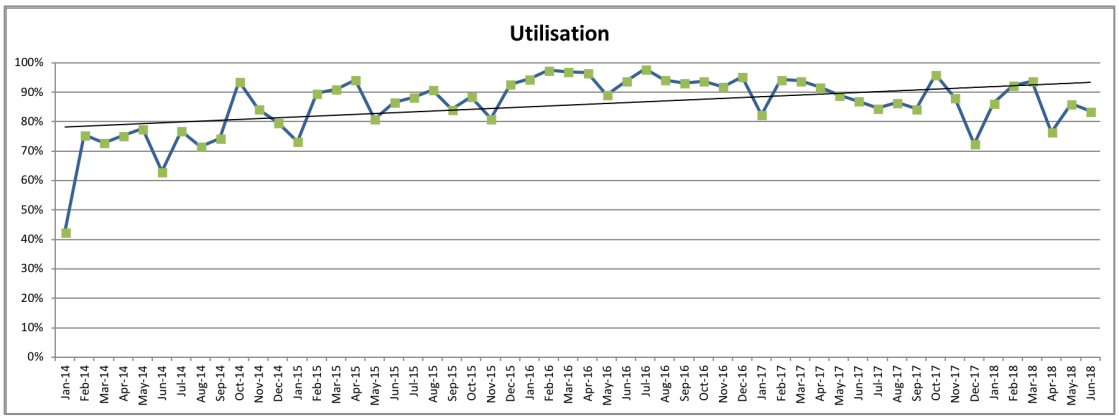
User	Quality token points	Comment made by user	Action taken
User 1	**** (positive)	None	None
User 2	**** (positive)	Smooth sailing these days. Working well.	None
User 1	**** (positive)	None	None
User 1	** (positive)	I have decreased my satisfaction because I could really use a 24/7 testing queue. The past few days I've been hampered by the lack of a 24/7 testing queue. I'm a parent and work flexible hours, sometimes at night. ARCHER should be as flexible as I am.	User contacted and question of duration of testing queue added as topic for next quarterly review meeting with EPSRC

3. Service Statistics

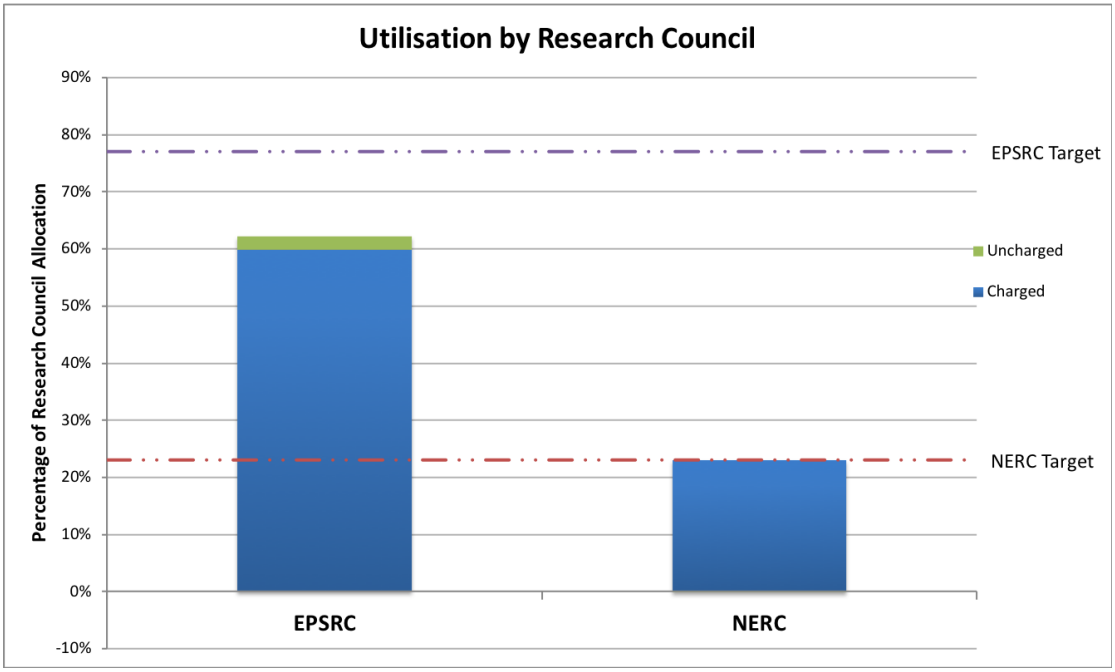
This section contains statistics on the ARCHER service as requested by EPSRC, SAC and SMB.

3.1 Utilisation

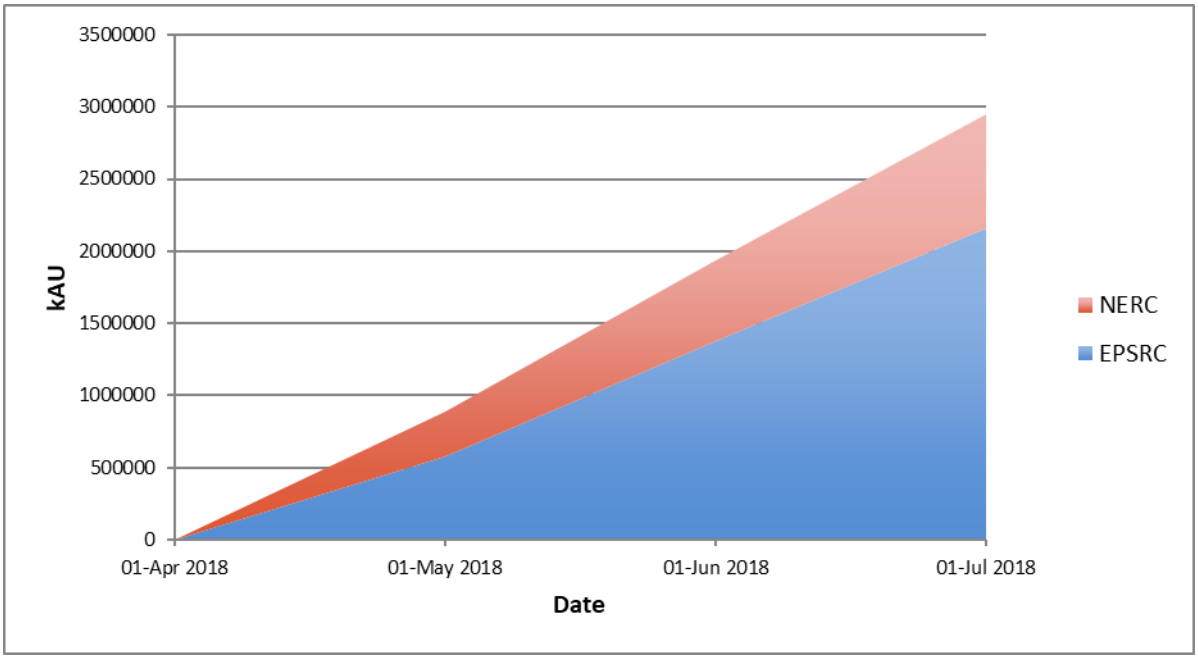
Utilisation over the quarter was 82%, down from 91% the previous quarter. The plot below shows a steady increase in utilisation over the lifetime of the service to Dec 2015 and since then the service has effectively been operating at maximum capacity as shown by the generally steady utilisation value. The recent dip in utilisation is thought to be related to EPSRC allocation levels and, to counteract this, EPSRC have issued further allocations to the Consortia to be used during 2018.



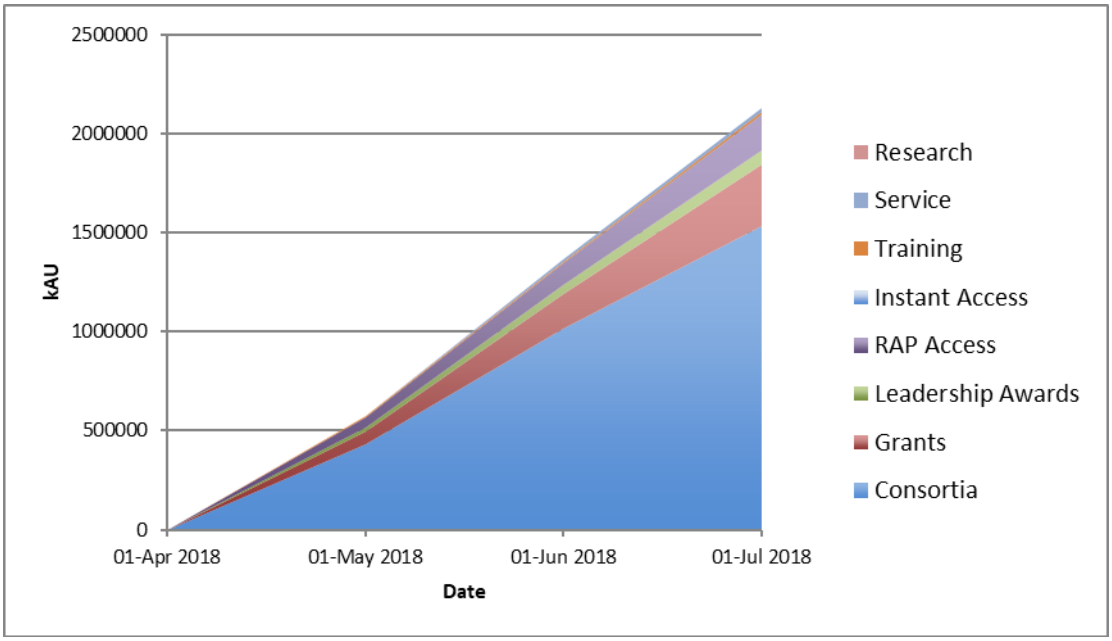
The utilisation by the Research Councils, relative to their respective allocations, is presented below. This bar chart shows the usage of ARCHER by the two Research Councils presented as a percentage of the total Research Council allocation on ARCHER. It can be seen that EPRSC did not meet their target this quarter with EPSRC being at 60% (against their target of 77%) whereas NERC met their target with utilisation being 23% (against their target of 23%). This compares with 63% for EPSRC and 27% for NERC for the previous quarter.



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

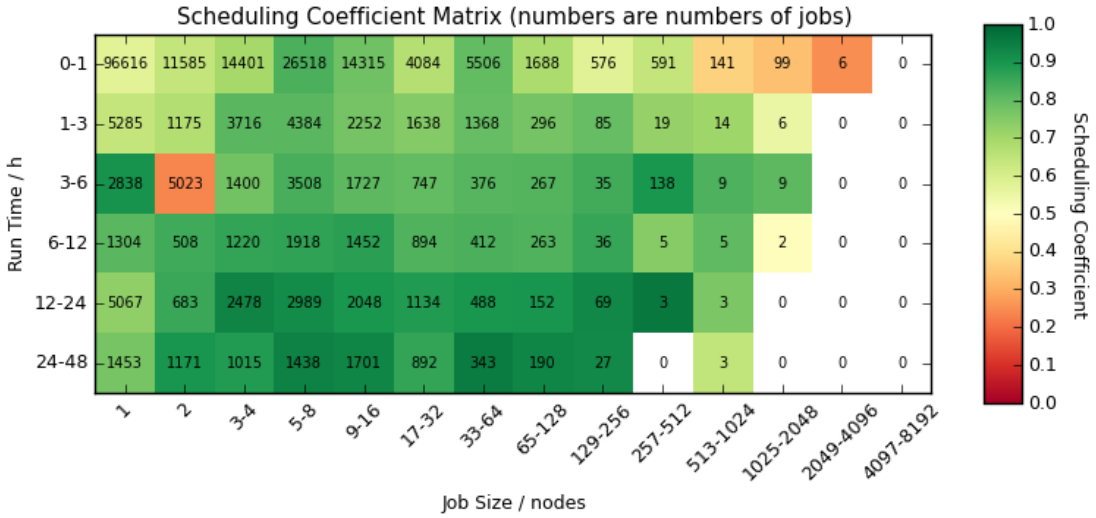


The cumulative allocation utilisation for the quarter by EPSRC broken down by different project types (see below) shows that the majority of usage comes from the scientific Consortia (as expected) with significant usage from research grants, ARCHER Leadership projects and ARCHER RAP projects. The times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



3.2 Scheduling Coefficient Matrix

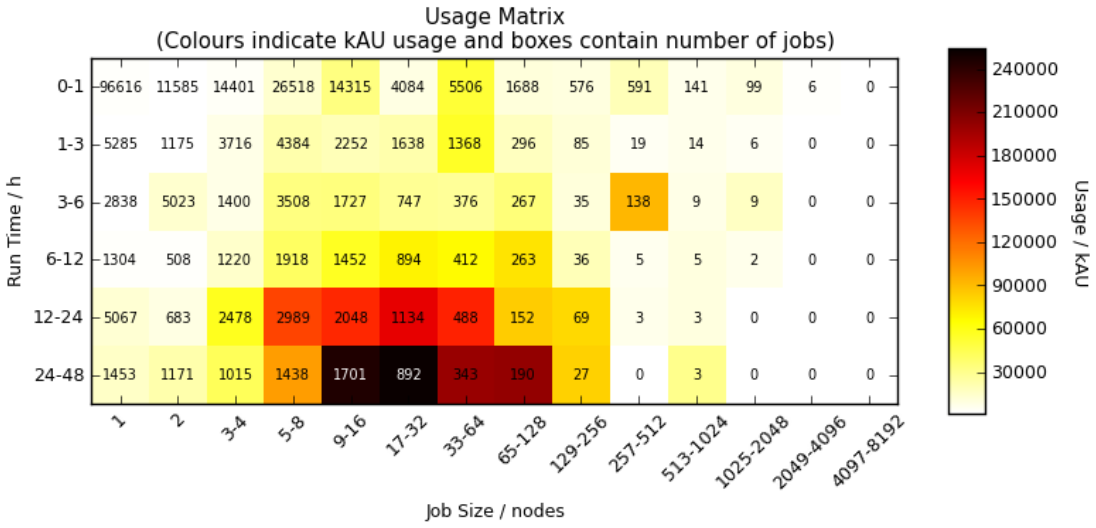
The colour in the matrix indicates the value of the Scheduling Coefficient. This is defined as the ratio of runtime to runtime plus wait time. Hence, a value of 1 (green) indicates that a job ran with no time waiting in the queue, a value of 0.5 (pale yellow) indicates a job queued for the same amount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



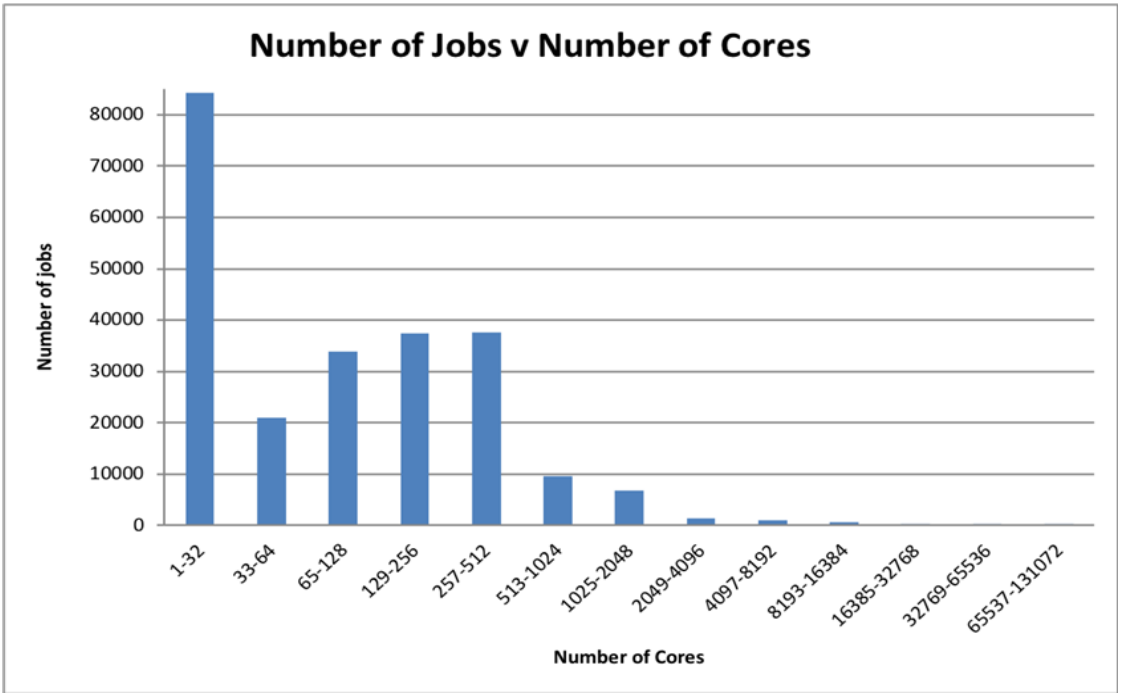
3.3 Additional Usage Graphs

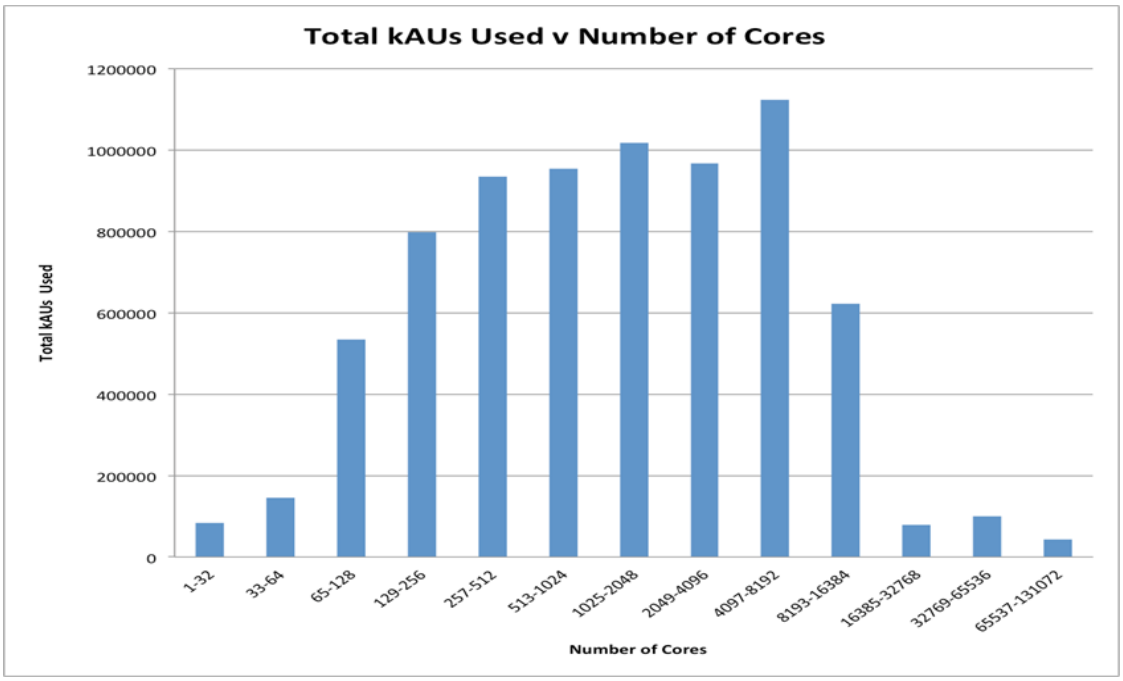
The following charts provide different views of the distribution of job sizes on ARCHER.

The usage heatmap below provides an overview of the usage on ARCHER over the quarter for different job sizes/lengths. The colour in the heatmap indicates the number of kAUs expended for each class, and the number in the box is the number of jobs of that class.



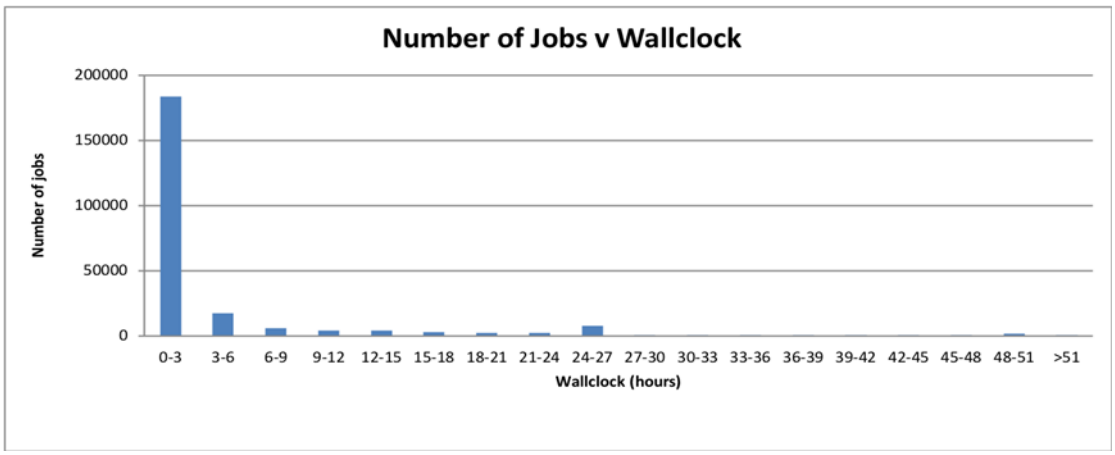
Analysis of Job Sizes

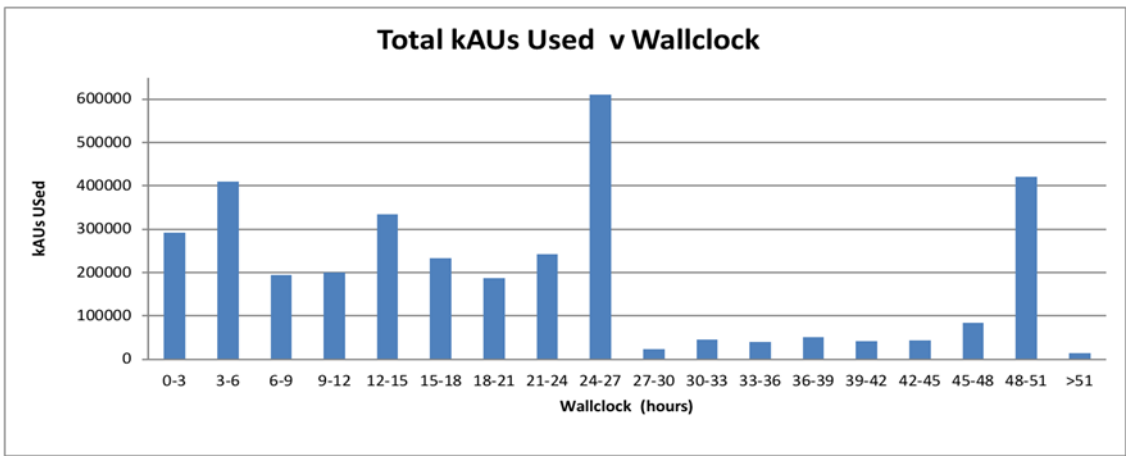




The first graph shows that, in terms of numbers, there are a significant number of jobs using no more than 1024 cores. However, the second graph reveals that most of the kAUs were spent on jobs between 65 cores and 16384 cores. The number of kAUs used is closely related to money and shows better how the investment in the system is utilised.

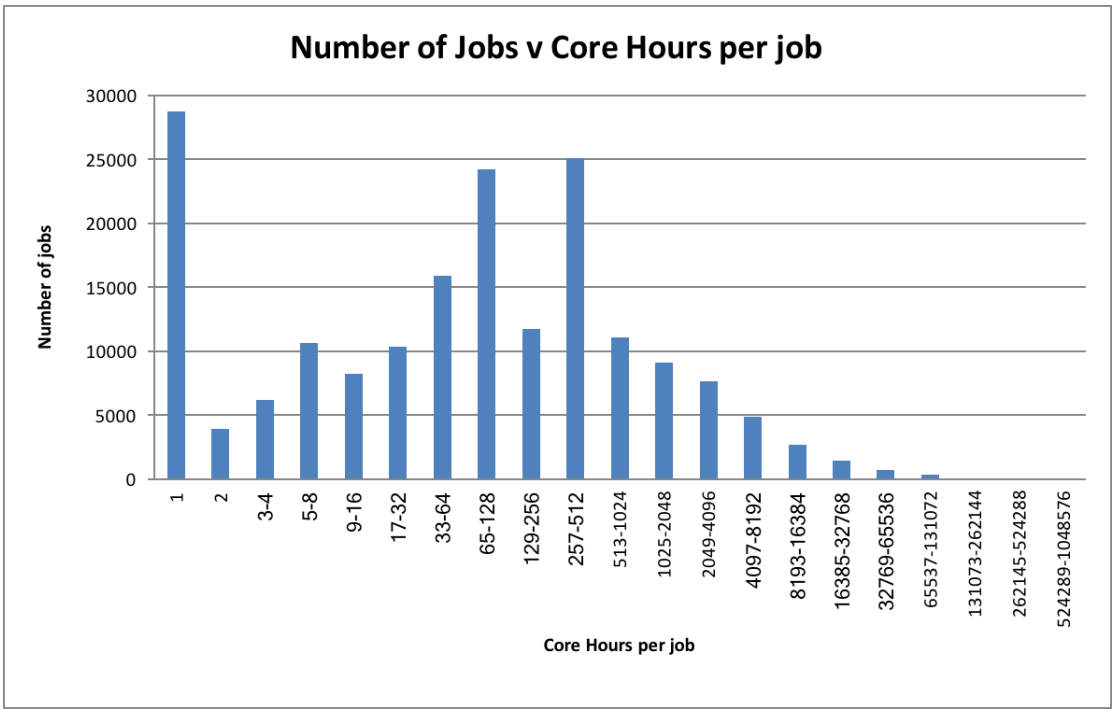
Analysis of Jobs Length

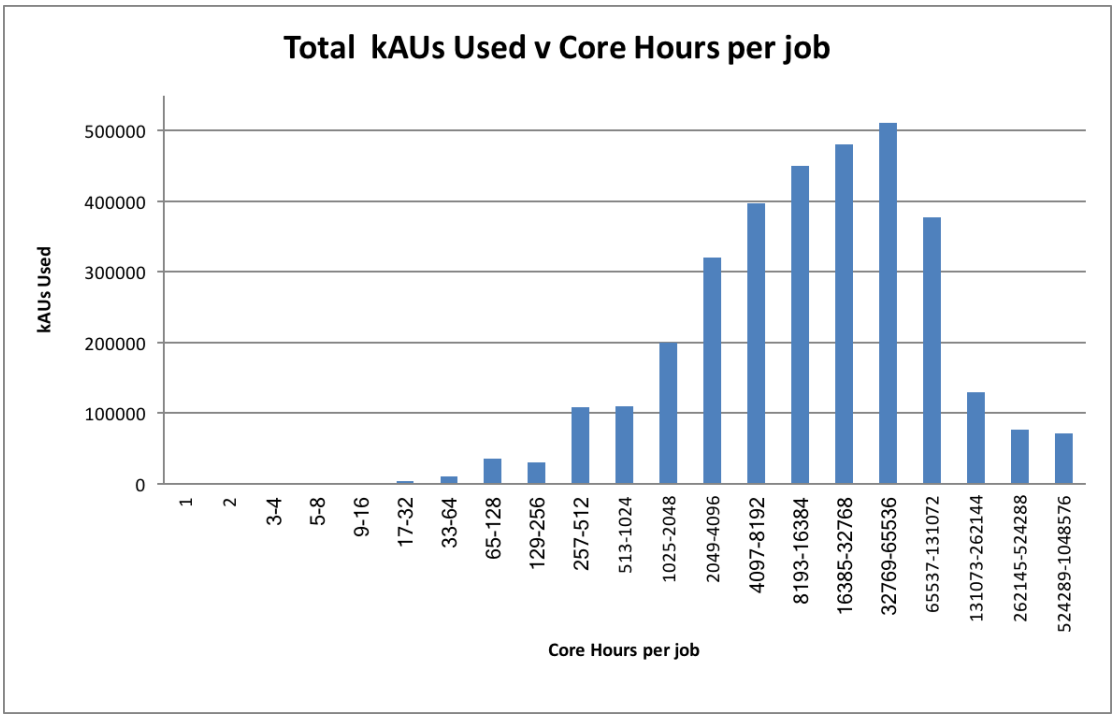




From the first graph, it would appear that the system is dominated by short jobs. However, the second graph shows that actual usage of the system is more spread and dominated by jobs of up to 27 hours with a second peak for jobs at 48-51 hours.

Core Hours per Job Analysis





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.