
# ARCHER SP Service Quarterly Report

Quarter 3 2019

# 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:

July 2019, August 2019 and September 2019.

- Utilisation over the quarter was 86% which is a decrease from the previous quarter where the utilisation was 93%.

- Work is ongoing to prepare for the end of the ARCHER service:

    - A data migration webinar was given to provide assistance for the user community in planning the data migration required for ARCHER2. The recording is available on the ARCHER website and the data migration guide has been updated with the same guidance information. The recorded session and the updated guide have been publicised in the weekly ARCHER news email to encourage the user community to prepare for the transition.

    - Service Exit Plans have been updated with the latest information we have, and will be finalised once the selection of the ARCHER2 service providers have been announced.

    - EPCC has been working with EPSRC to provide assistance to them in planning the transition of user data and projects from ARCHER to ARCHER2.

- Diversity and inclusion has always been key to the way EPCC has run the ARCHER service. This is demonstrated with our work with Women in HPC and the Faces of HPC website we run. A Diversity and Inclusion policy is now included as a part of the ARCHER service policies (see http://www.archer.ac.uk/about-archer/policies/diversity-inclusion.php).

- A Tier1/Tier2 half day workshop was held and co-located with the RSE Conference, which took place in September 2019; there were 25 attendees at the workshop. Members of the Tier 1 and Tier 2 communities took part in sessions focused on Education, Running Tier 2 Centres and Domain Specific Languages. The meeting concluded with a breakout discussion session on how we as a community could develop a knowledge base. We plan to follow this initial discussion with a future meeting to further progress the knowledge base ideas.

- Further work has been carried out on the business continuity and disaster recovery process to carry out a business impact assessment of the scenarios that could potentially affect the service. A business continuity plan has been developed giving details of how the service assessed the risks that could impact it and the plans that have been put in place to ensure recovery of service should such a significant incident occur.

## 1.2 Forward Look

- A Business Continuity and Disaster Recovery (BCDR) scenario test is planned for October. This will take the form of a scenario which will impact both staff based at the Bayes Centre and the HPC Systems team at the ACF. An independent team has been planning the scenario but the staff involved will not know the exact timing of the scenario or the nature of it until it starts. User service will be kept uninterrupted during the exercise as the test team will monitor the service and step in if any issues are foreseen. The aims of the test are to verify the processes in place, identify improvements and to ensure that staff have had the necessary training should such an event occur. At the end of the exercise a lessons learned review will be carried out to highlight any service or process improvements required and any training required. The same approach was used with the previous scenario test, which involved the closing of the JCMB building by 'fire'. The lessons learned from this simulation were invaluable when heavy snowfall caused the university to close in 2018 and the processes developed ensured the service was able to run uninterrupted with the staff working remotely from home.

- With the importance placed on having robust business continuity and disaster recovery plans and processes in place, EPCC is planning to start working towards obtaining ISO 22301 business continuity certification.

- PBS, the job scheduler for ARCHER, is due to be upgraded from version 12.2.401 to version 13.0.412 to take advantage of improvements and fixes to issues provided in the upgraded version.

- In order to facilitate faster data movement to the RDF GPFS filesystems from the ARCHER login nodes, the existing bonded pair of 10gbit links from the ARCHER core switches to the RDF sitewide network is being upgraded to a pair of 40gbit links. This is currently being tested using the TDS. The increase in transfer speed will assist users in transferring data from ARCHER to ARCHER2 via the RDF.

- Plans are underway for increasing the ACF external and internal network links to 100GB improving communication speeds for the user community.

- Work is underway to prepare for a combined ISO 9001 Quality Management and ISO 27001 Information Security external audit in October 2019. Moving to a combined system and audits leverages the strengths of the process-based quality management approach with the controls provided by the information security management system to deliver the best and most secure service to our users.

# 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 19 | | Aug 19 | | Sep 19 | | 19Q3 |
|---|---|---|---|---|---|---|---|
| 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 | 98.6% | -2 | 98.4% | -2 | 98.0% | -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 was one unplanned service failure this quarter. ARCHER was rebooted on the 14th August due to a problem with the High Speed Network. Cray are still investigating the root cause.

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 19Q3.

## 2.2 Detailed Service Level Breakdown

### 2.2.1 Phone Response (PR)

| | Jul 19 | Aug 19 | Sep 19 | 19Q3 |
|---|---|---|---|---|
| Phone Calls Received | 22 (5) | 10 (1) | 15 (1) | **47 (7)** |
| Answered in 2 Minutes | 22 | 10 | 15 | **47** |
| **Service Level** | **100.0%** | **100.0%** | **100.0%** | **100.0%** |

The volume of telephone calls remained low in 19Q3. Of the total of 47 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)

| | Jul 19 | Aug 19 | Sep 19 | 19Q3 |
|---|---|---|---|---|
| Self-Service Admin | 418 | 237 | 434 | **1089** |
| Admin | 118 | 101 | 89 | **307** |
| Technical | 19 | 25 | 25 | **69** |
| *Total Queries* | 555 | 363 | 548 | **1465** |
| *Total Closed in 2 Days* | 547 | 357 | 537 | **1440** |
| **Service Level** | **98.6%** | **98.4%** | **98.0%** | **98.3%** |

The above table shows the queries closed by SP during the period.

In addition to the Admin and Technical queries, the following Change Requests were resolved in 19Q3:

| | Jul 19 | Aug 19 | Sep 19 | 19Q3 |
|---|---|---|---|---|
| Change Requests | 0 | 0 | 1 | **1** |

### 2.2.3 User Registration (UR)

| | Jul 19 | Aug 19 | Sep 19 | 19Q3 |
|---|---|---|---|---|
| No of Requests | 85 | 57 | 104 | **246** |
| Closed in One Working Day | 85 | 57 | 104 | **246** |
| Average Closure Time (Hrs) | 0.6 | 0.9 | 0.8 | **0.8** |
| Average Closure Time (Working Days) | 0.06 | 0.10 | 0.10 | **0.08** |
| **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:

| | Jul 19 | Aug 19 | Sep 19 | 19Q3 |
|---|---|---|---|---|
| CRAY | 2 | 4 | 6 | **12** |
| ARCHER_CSE | 77 | 54 | 149 | **280** |
| ARCHER_SP | 847 | 705 | 922 | **2476** |
| Total Queries Assigned | 928 | 763 | 1077 | **2768** |
| Total Assigned in 1 Hour | 928 | 763 | 1076 | **2767** |
| **Service Level** | **100.0%** | **100.0%** | **99.9%** | **100.0%** |

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 are also additional “at-risk” sessions that may be scheduled for other Wednesdays. This reduces the number of sessions 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.

Feedback has shown that the users would be happier if there were even fewer full outage maintenance sessions, and so we have been working to reduce these as much as possible. Some maintenance activities can only be done during a full outage (e.g., applying firmware updates), but for others the requirement to take a full outage can be evaluated on an individual basis based on potential risk.

No planned maintenance outages were taken this quarter, with all maintenance work carried out during live service in ‘at-risk’ sessions to reduce the impact on the user community.

### 2.3.3 Quality Tokens and query feedback emails

No quality tokens were received this quarter.

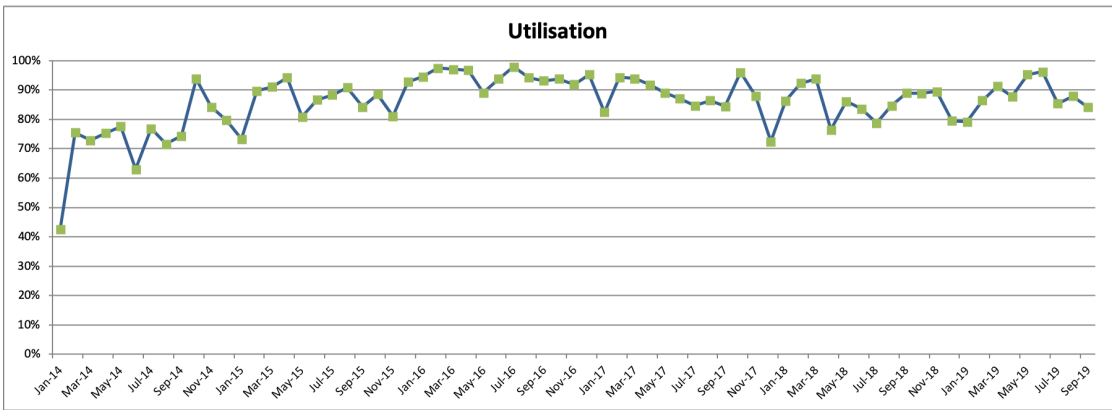
Three very positive feedback emails were received from users upon closure of their queries. No negative feedback emails were received.

# 3. Service Statistics

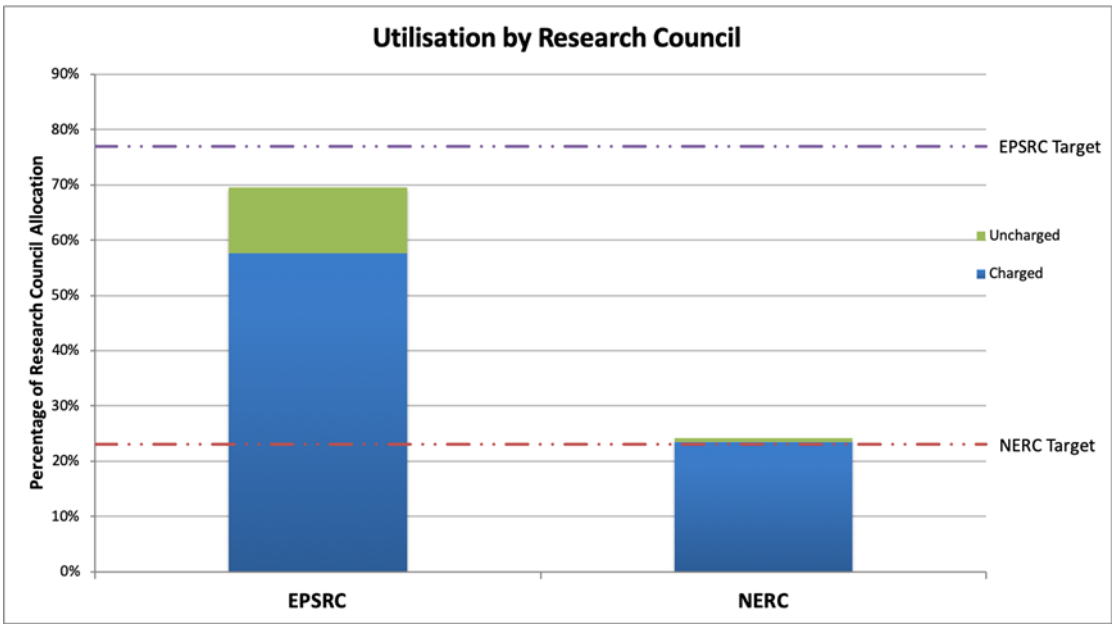
This section contains statistics on the ARCHER service as requested by EPSRC, SAC and SMB.

## 3.1 Utilisation

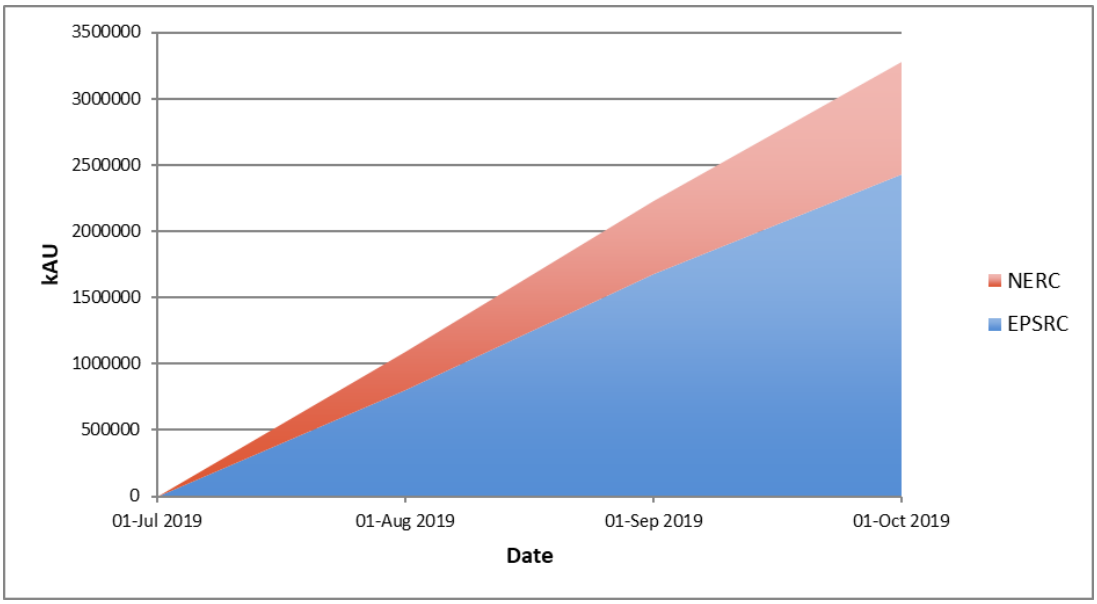
Utilisation over the quarter was 86%, down from 93% the previous quarter. Utilisation for July was 85%, for August 88% and for June 84%. The plot below shows a steady increase in utilisation over the lifetime of the service to Dec 2015 and since then the service has effectively been operating around maximum capacity as shown by the generally steady utilisation value.



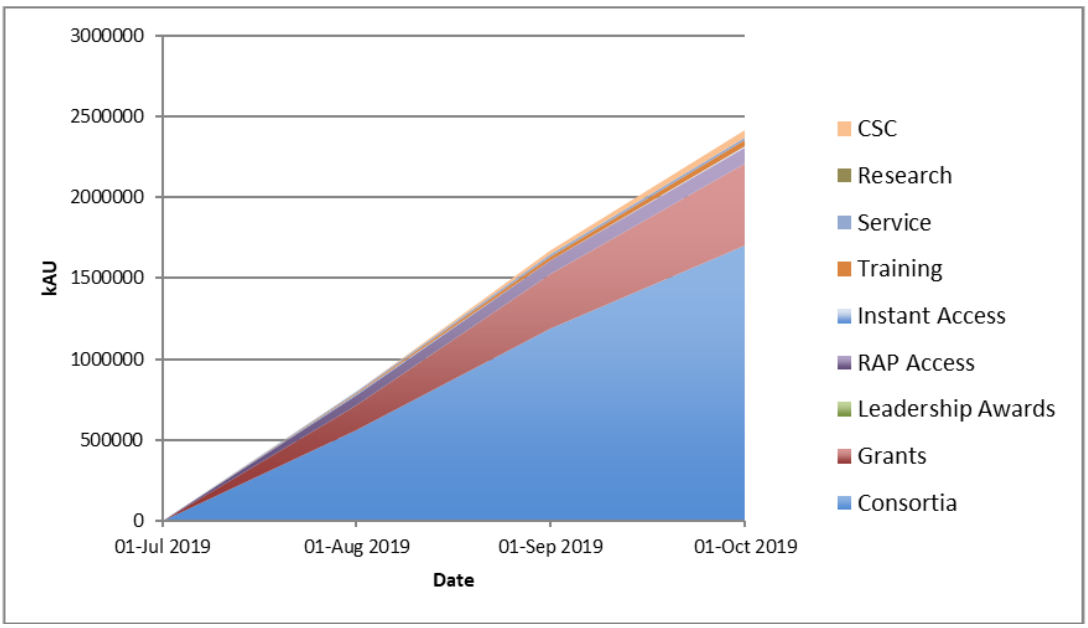

The utilisation by the Research Councils, relative to their respective allocations, is presented below. This bar chart shows the usage of ARCHER by the two Research Councils presented as a percentage of the total Research Council allocation on ARCHER. It can be seen that EPRSC did not meet their target this quarter with their usage being at 70% (against their target of 77%) whereas NERC exceeded their target with utilisation being 24% (against their target of 23%). This compares with 76% for EPSRC and 25% for NERC for the previous quarter.



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

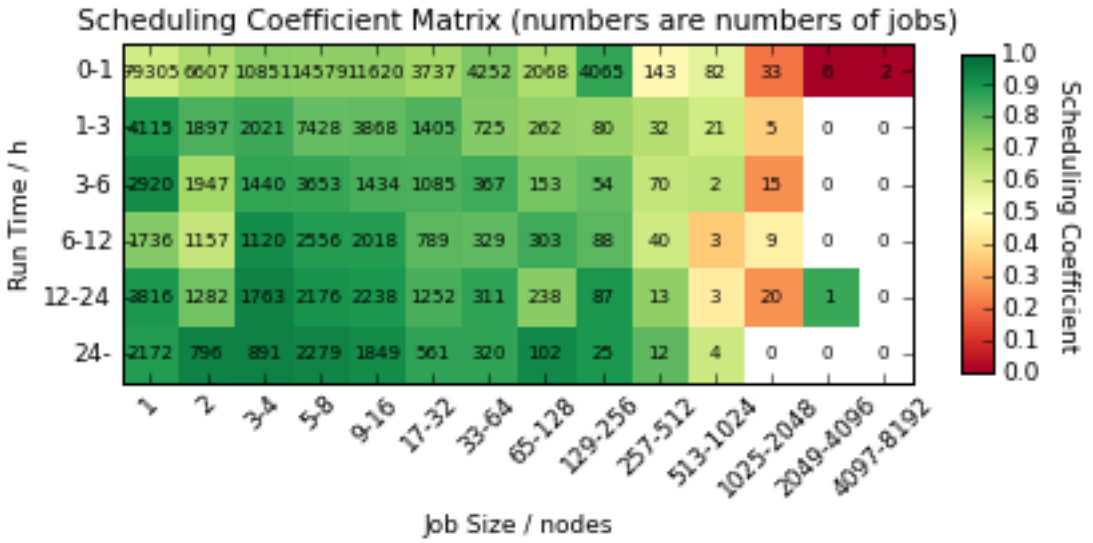



The cumulative allocation utilisation for the quarter by EPSRC broken down by different project types (see below) shows that the majority of usage comes from the scientific Consortia (as expected) with significant usage from research grants, CSC (the Finnish IT Center for Science) and ARCHER RAP projects. The total time used by Instant Access projects is very small.



## 3.2 Scheduling Coefficient Matrix

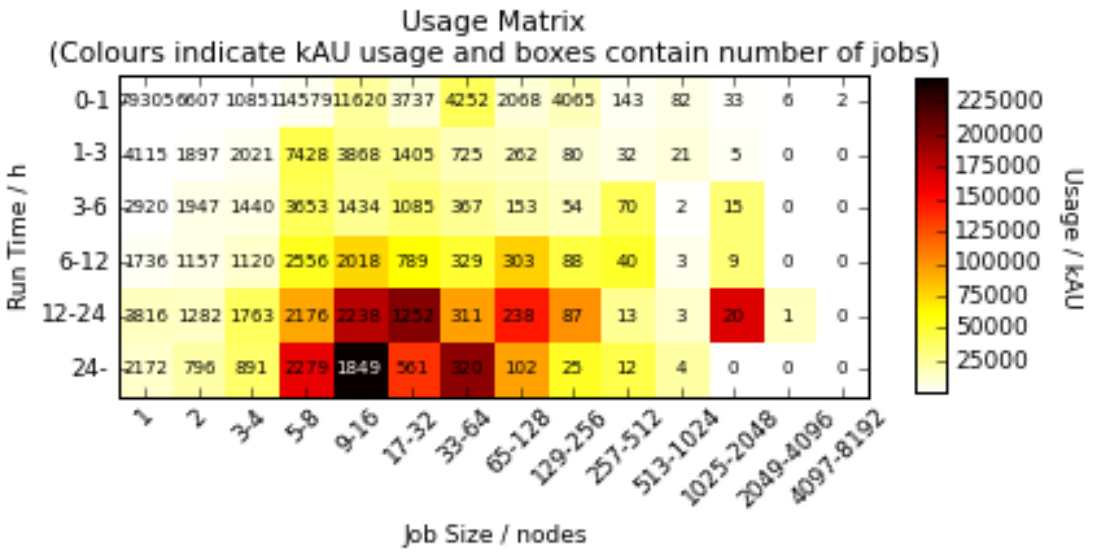
The colour in the matrix indicates the value of the Scheduling Coefficient. This is defined as the ratio of runtime to runtime plus wait time. Hence, a value of 1 (green) indicates that a job ran with no time waiting in the queue, a value of 0.5 (pale yellow) indicates a job queued for the same amount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



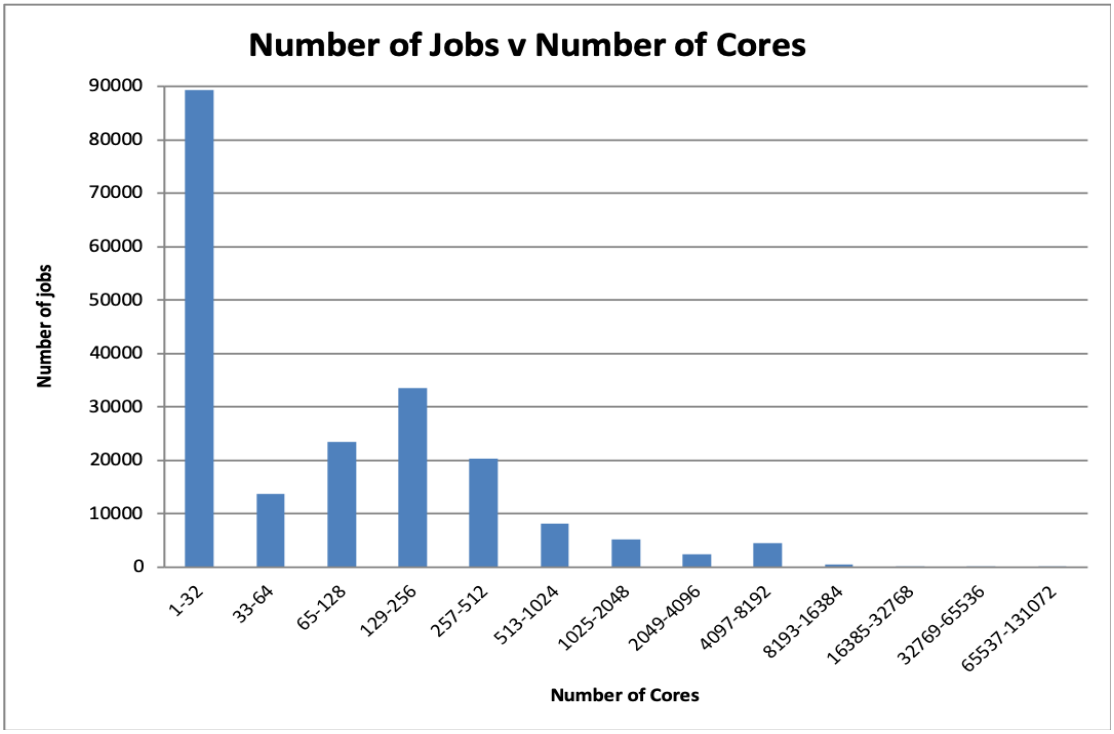

## 3.3 Additional Usage Graphs

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

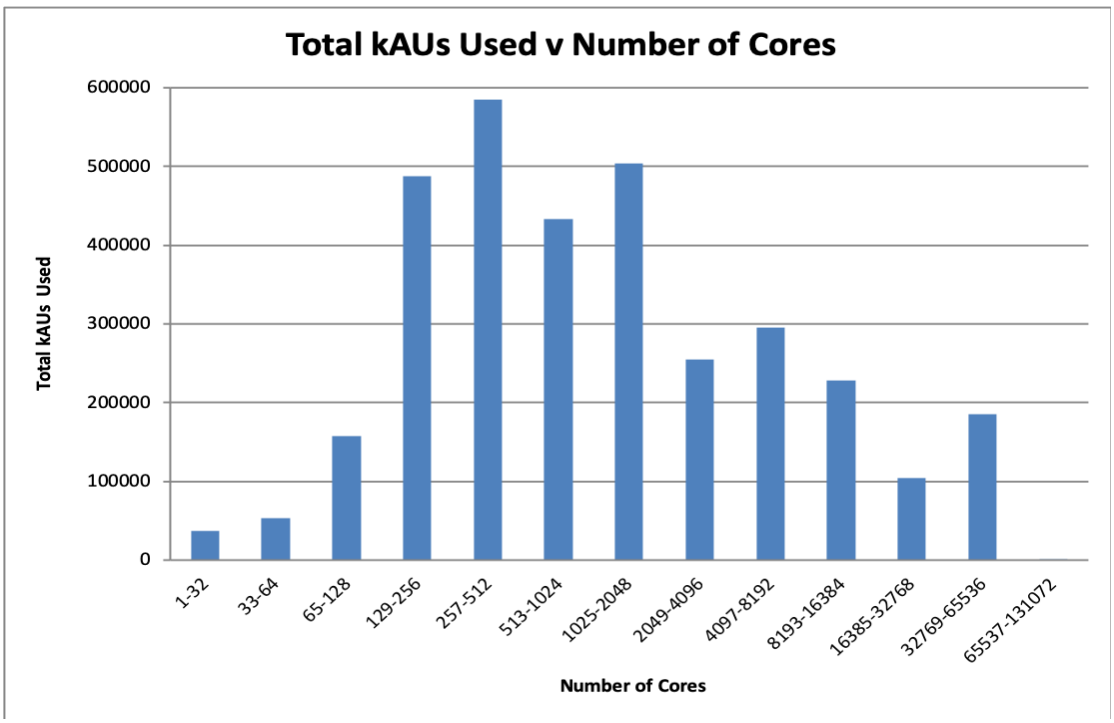
The usage heatmap below provides an overview of the usage on ARCHER over the quarter for different job sizes/lengths. The colour in the heatmap indicates the number of kAUs expended for each class, and the number in the box is the number of jobs of that class.



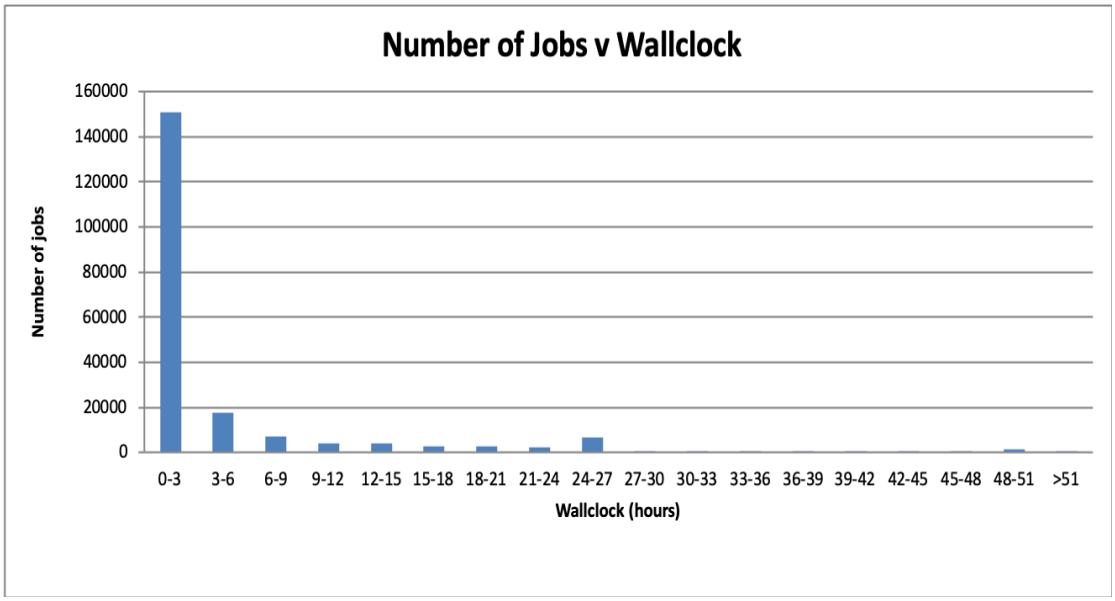
## Analysis of Job Sizes

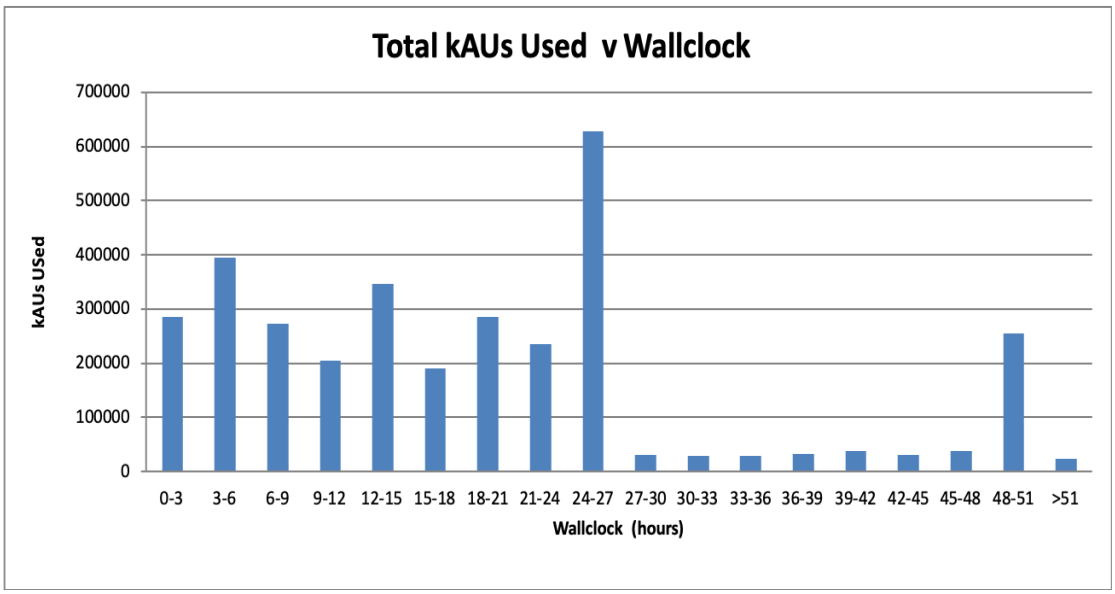



The first graph shows that, in terms of numbers, there are a significant number of jobs using no more than 512 cores. However, the second graph reveals that most of the kAUs were spent on jobs between 129 cores and 16384 cores. The number of kAUs used is closely related to money and shows better how the investment in the system is utilised.



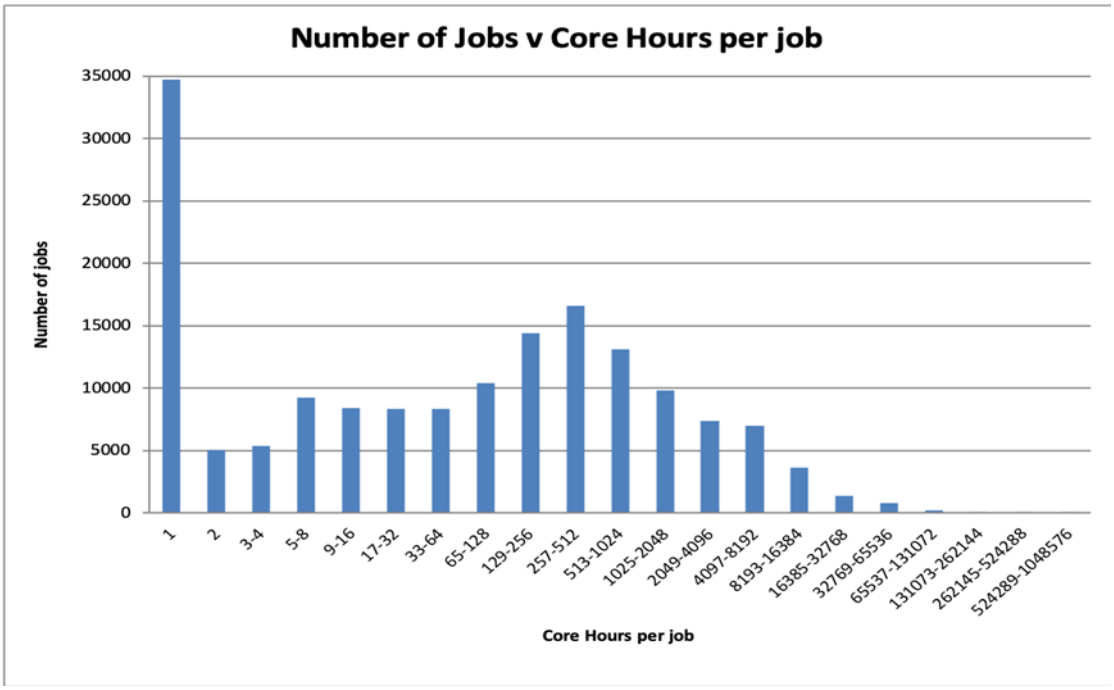
## Analysis of Jobs Length

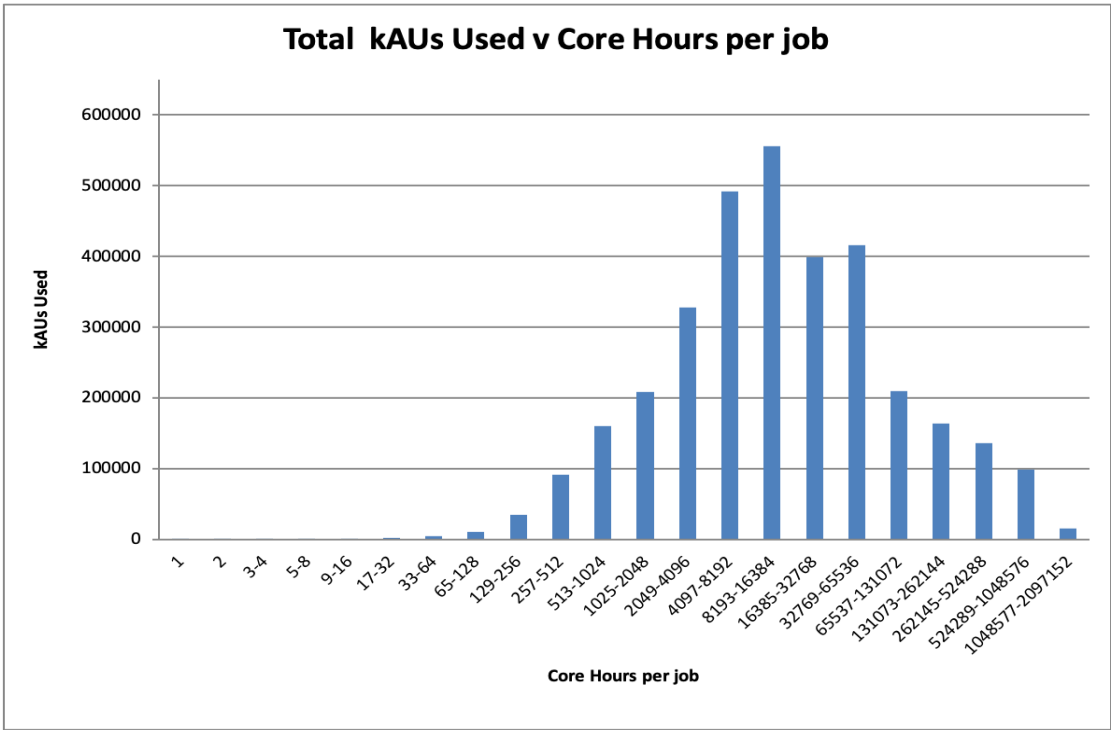



From the first graph, it would appear that the system is dominated by short jobs. However, the second graph shows that actual usage of the system is more spread and dominated by jobs of up to 27 hours with a second peak for jobs at 48-51 hours.

## 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.