



ARCHER2

SP Quarterly Report

October – December 2021

EPCC

The University of Edinburgh



Document Information and Version History

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Status	Release
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Reviewer(s)	Alan Simpson

Version	Date	Comments, Changes, Status	Authors, contributors, reviewers
0.1	09/12/2021	Template created	Jo Beech-Brandt
0.2	04/01/2022	Added contractual information, graphs and narrative	Jo Beech-Brandt
0.3	05/01/2022	Query feedback and ISO Information added	Anne Whiting
0.4	06/01/2022	Added heatmaps and narrative	Clair Barrass, Stephen Booth
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0.6	13/01/2022	Review	Alan Simpson
1.0	13/02/2022	Version for UKRI	Alan Simpson, Jo Beech-Brandt



1 The ARCHER2 Service

This is the report for the ARCHER2 SP Service for the Reporting Period 1st October – 31st December 2021.

1.1 Service Highlights

- The ARCHER2 full system opened to all users on 22nd November and took the place of the ARCHER2 4-Cabinet system as the UK National HPC Service. A well-attended webinar advising users on the transition process resulted in a seamless transition for users. Documentation and a blog was also provided and advertised to users.
- An initial uncharged period was enabled on ARCHER2 full system. To ensure an equitable usage policy for all users, a fair-share policy was implemented within the slurm batch system and advertised to users.
- A total of 147 pieces of query feedback have been received this quarter from a total of 2879 queries handled. Of these the majority were rated good and above, with 73% rated excellent.
- A donation of £1 per user feedback response has been made to our selected charity, Save the Children. This quarter a total donation of £289 has been made, with £147 from the SP Query feedback.
- A business continuity and disaster recovery test was carried out at our datacentre, the ACF, looking at how we would handle an incident with a fire on the roof of the building. This was a very interesting exercise and identified areas for improvement that are now being implemented.
- Following on from the success we have achieved with our ISO 27001 (information security) and ISO 9001 (quality) certifications and ongoing improvement work, we have started the preparatory work to achieve the ISO 22301 (business continuity) standard. This standard promotes best practice in planning for service resilience and minimising impact and downtime of service outages, thus minimising disruption to our users.
- A SAFE report was produced which enables a view of the availability of the full system. This was tailored for use by stakeholders during the Stability Trial.
- XALT is now available on the ARCHER2 full system and initial analysis of the software used is being carried out.
- A benefits realisation report has been developed in the SAFE to assist UKRI in the development of the business case for future investment in HPC. Further work on this report is ongoing.

1.2 Forward Look

- The uncharged period on ARCHER2 full is system is scheduled to end on January 4th. Users have been asked to ensure that all required data is removed from the ARCHER2 4-Cabinet system by 4th January.
- Further work will be carried out to prepare for ISO 22301 and our regular yearly cycle of internal audits and service improvements will continue.
- We await the arrival of the GPU nodes and the burst buffer memory for the ARCHER2 full system, and will work with HPE to ensure the new additions are ready for user use.
- Now that charging has been enabled on the full system we will monitor usage on the full system and queue wait times, to ensure the queue structure is fit for purpose and make modifications if necessary.

2 ARCHER2 Performance Report

This is the contractual performance report for the ARCHER2 SP Service for the Reporting Periods from 1 October 2021 until 31 December 2021.

2.1 Service Points and Service Credits

The Service Levels and Service Points for the SP service are defined by EPSRC in Schedule 2.2 of ARCHER2 SP Service Contract.

The Working Day (WD) for the ARCHER2 Service is 10 Working Hours (WH) as the Service operates from 0800-1800. The Median Time to Resolution is measured in WD.

- **Availability:** Service Threshold OY1: $\leq 96.5\%$; Operating Service Level: $>98.0\%$, $\leq 98.5\%$.
- **ARCHER2_SP_Level1 (MTR):** The Median Time to Resolution, of all SP queries falling within Level 1 resolved by the Contractor in the Reporting Period. MTR Service Threshold: >1 WD; Operating Service Level: >0.3 WD, ≤ 0.45 WD.
- **ARCHER2_SP_Level2 (MTR):** The Median Time to Resolution, of all SP queries falling within Level 2 resolved by the Contractor in the Reporting Period. MTR Service Threshold: >8 WD; Operating Service Level: >2 WD, ≤ 4 WD.
- **ARCHER2_SP_Level3 (MTR):** The Median Time to Resolution, of all SP queries falling within Level 3 resolved by the Contractor in the Reporting Period. MTR Service Threshold: >25 WD; Operating Service Level: >12 WD, ≤ 16 WD.
- **Initial Response to Queries (%):** The percentage of the total number of SP queries assigned to the Contractor in the Reporting Period responded to within 3 Working Hours. Service Threshold: $<96.00\%$; Operating Service Level: $98.00 - 98.99\%$.
- **Query User Satisfaction (%):** The percentage of the total number of query satisfaction surveys completed in each Reporting Period, rating the quality of the resolution of Queries by the Contractor as "Good", "Very Good" or "Excellent". Operating Service Level: $82.00 - 87.99\%$

2.1.1 Service Points

Metric	Oct 2021		Nov 2021		Dec 2021		Q4 2021	
	Perf	Points	Perf	Points	Perf	Points	Perf	Points
Availability	-	-	100% ¹	-3	100%	-3	100% ¹	-6
SP_Level1 (MTR) ¹	0.00	-2	0.00	-2	0.00	-2	0.00 ¹	-6
SP_Level1 (MTR) ²			0.00				0.00 ²	
SP_Level2 (MTR) ¹	0.07	-2	0.08	-2	0.06	-2	0.07 ¹	-6
SP_Level2 (MTR) ²			0.08				0.07 ²	
SP_Level3 (MTR) ¹	4.04	-2	4.50	-2	4.25	-2	4.14 ¹	-6
SP_Level3 (MTR) ²			-				4.25 ²	
Initial Response (%)	100%	-1	100%	-1	100%	-1	100%	-3
Query Satisfaction (%)	97%	-2	100%	-2	97%	-2	99%	-6
Total		-9		-9		-9		-33

The service metrics are calculated for the UK National Service. The ARCHER2 4-Cabinet system was replaced by the ARCHER2 full system as the UK National Service on the 22nd November.

[1] Metrics calculated until 22nd November on the ARCHER2 4-Cabinet system.

[2] Metrics calculated from 22nd November on the ARCHER2 full system.

2.1.2 Service Credits

As the Total Service Points are negative (-33), no Service Credits apply in 21Q4.

2.2 SP Query Statistics

The metrics were specified by EPSRC in Schedule 2.2 of ARCHER2 SP Service Contract.

- **Assigned:** The number of SP queries assigned to the Contractor within each query resolution category in the Reporting Period.
- **Resolved:** The number of SP queries resolved by the Contractor within each query resolution category in the Reporting Period.
- **Backlog:** The number of SP queries assigned to the Contractor that remained unsolved within each query resolution category in the Reporting Period
- **Correspondence:** The average number of pieces of correspondence generated for SP queries in each query resolution category.
- **First Response:** The average time taken for the Contractor to first respond to the Originator of the SP query.

October 2021					
Service level	Assigned	Resolved	Backlog	Correspondence	First Response
SP_Level1	1025	1025	0	0.138	0:00:59
SP_Level2	121	116	17	8.103	0:18:35
SP_Level3	4	8	1	15.75	0:44:22
November 2021					
Service level	Assigned	Resolved	Backlog	Correspondence	First Response
SP_Level1 ¹	453	453	0	0.210	0:00:48
SP_Level1 ²	541	541	0	0.072	0:00:45
SP_Level2 ¹	91	96	12	7.750	0:22:37
SP_Level2 ²	76	51	29	8.627	0:18:39
SP_Level3 ¹	2	1	2	27	0:59:08
SP_Level3 ²	5	0	5	0	0:00:00
December 2021					
Service level	Assigned	Resolved	Backlog	Correspondence	First Response
SP_Level1	466	466	0	0.137	0:00:38
SP_Level2	107	118	18	7.492	0:15:21
SP_Level3	8	4	9	8.500	0:43:01
Q4 2021					
Service level	Assigned	Resolved	Backlog	Correspondence	First Response
SP_Level1 ¹	1478	1478	0	0.160	0:00:55
SP_Level1 ²	1007	1007	0	0.102	0:00:41
SP_Level2 ¹	212	212	12	7.943	0:20:25
SP_Level2 ²	183	169	18	7.834	0:16:21
SP_Level3 ¹	6	9	2	17.000	0:46:00
SP_Level3 ²	13	4	9	8.500	0:43:01

[1] Metrics calculated until 22nd November on the ARCHER2 4-Cabinet system.

[2] Metrics calculated from 22nd November on the ARCHER2 full system.

2.3 Query Resolution

Metric	Oct 2021		Nov 2021		Dec 2021		Q4 2021	
Service Level	MTR	Resolved	MTR	Resolved	MTR	Resolved	MTR	Resolved
SP_Level1 ¹	0:00:48	1025	0:00:31	453			0:00:39	1478
SP_Level1 ²			0:00:00	541	0:00:31	466	0:00:15	1007
SP_Level2 ¹	0:42:30	116	0:45:19	96			0:44:29	212
SP_Level2 ²			0:48:33	51	0:39:50	118	0:42:29	169
SP_Level3 ¹	40:24:20	8	44:57:39	1			41:23:01	9
SP_Level3 ²			0	0	42:31:07	4	42:31:07	4
Total		1149		1142		588		2879

[1] Metrics calculated until 22nd November on the ARCHER2 4-Cabinet system.

[2] Metrics calculated from 22nd November on the ARCHER2 full system.

A total of 2879 queries were resolved by the ARCHER2 SP Service in the Reporting Period. The percentage of user queries responded to within 3 hours was 100%.

2.4 Query Feedback

During October, there were 39 feedback scores received during this period. 97% were Good, Very Good or Excellent with 62% given the highest score of Excellent.

During November, there were 68 feedback scores received during this period. 100% were Good, Very Good or Excellent with 76% given the highest score of Excellent.

During December, there were 37 feedback scores received during this period. 97% were Good, Very Good or Excellent with 76% given the highest score of Excellent.

Overall, during Quarter 4, there were 147 feedback scores received during this period. 99% were Good, Very Good or Excellent with 73% given the highest score of Excellent.

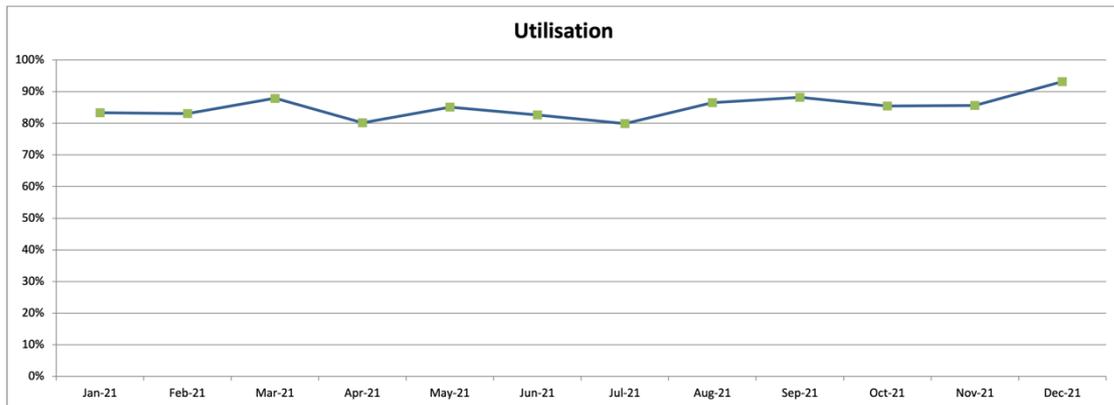
2.5 Maintenance and Outages

Type	Start	End	Duration	User Impact	Reason
Partial: Compute Nodes	01/10/21 09:52	01/10/21 15:44	5:52	Users were able to connect to User Access Nodes and were able to submit jobs to the compute nodes. Queued jobs started once the compute nodes were returned to service.	A power issue at a substation local to the Advanced Computing Facility (ACF).
Full	26/10/21 09:00	26/10/21 17:00	8:00	Users were unable to run jobs and the /work filesystem was unavailable	Reboot of the High Speed Network (HSN). River (support) rack to move it to a new protected power supply.

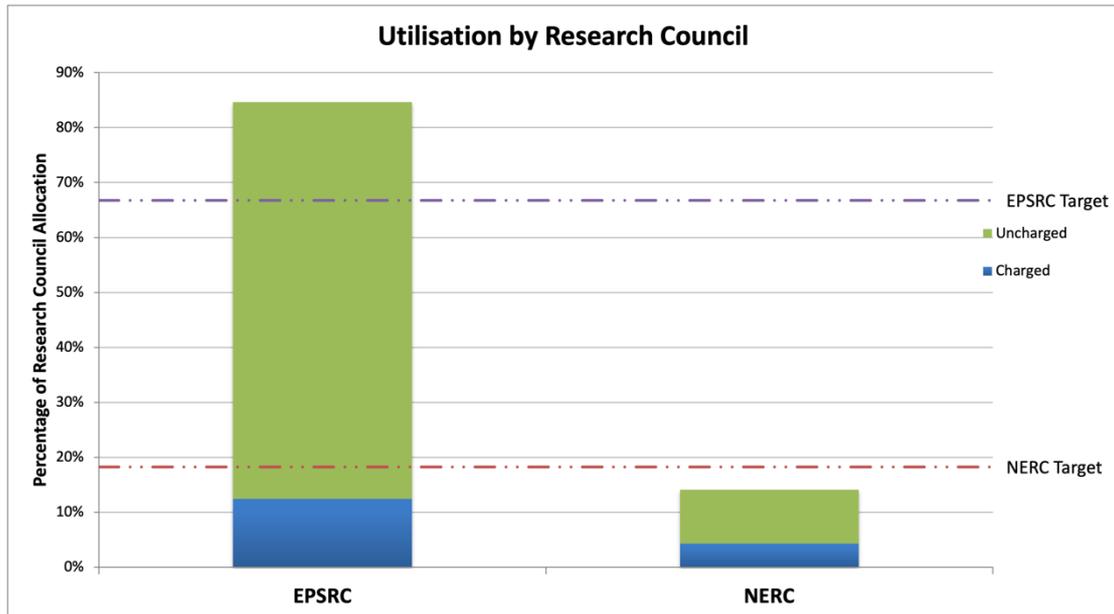
3 ARCHER2 Service Statistics

3.1 Utilisation

Utilisation from 1 October – 31 December is 90% which is slightly increased from 85% the previous quarter. Utilisation for October was 86%, for November 86% and for December 90%. The ARCHER2 full system was opened to user service from 22nd November so the November utilisation is based on the ARCHER2 4-Cabinet utilisation from 1st-22nd November and the ARCHER2 full system utilisation from 22nd-30th November.



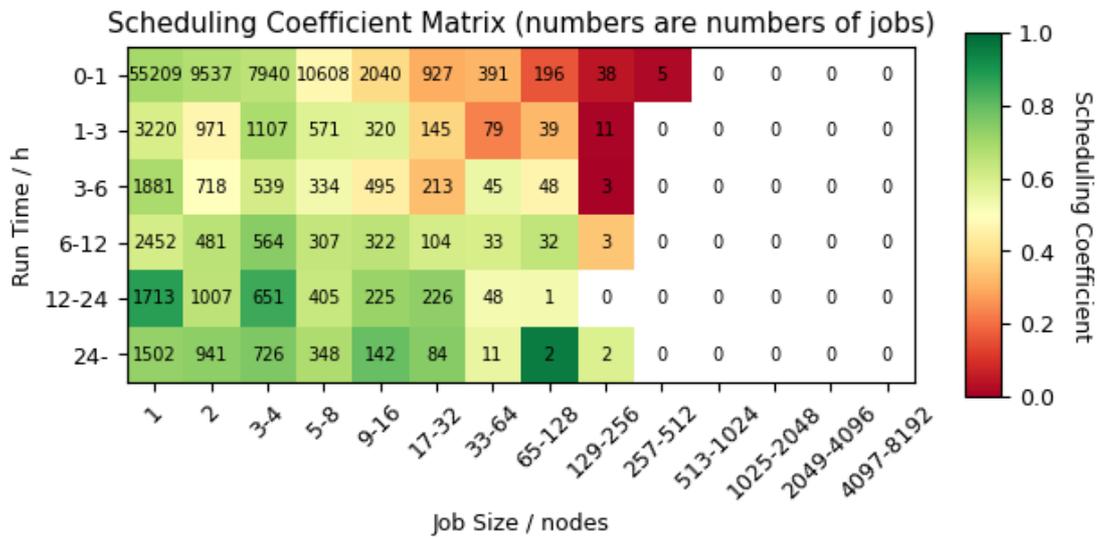
The utilisation by the Research Councils, relative to their respective allocations, is presented below. This bar chart shows the usage of ARCHER2 by the two Research Councils presented as a percentage of the total Research Council allocation on ARCHER2. It can be seen that EPSRC exceeded their target this quarter with their usage being at 84.6% (against their target of 66.8%) but NERC missed their target with utilisation being 14.1% (against their target of 18.2%).



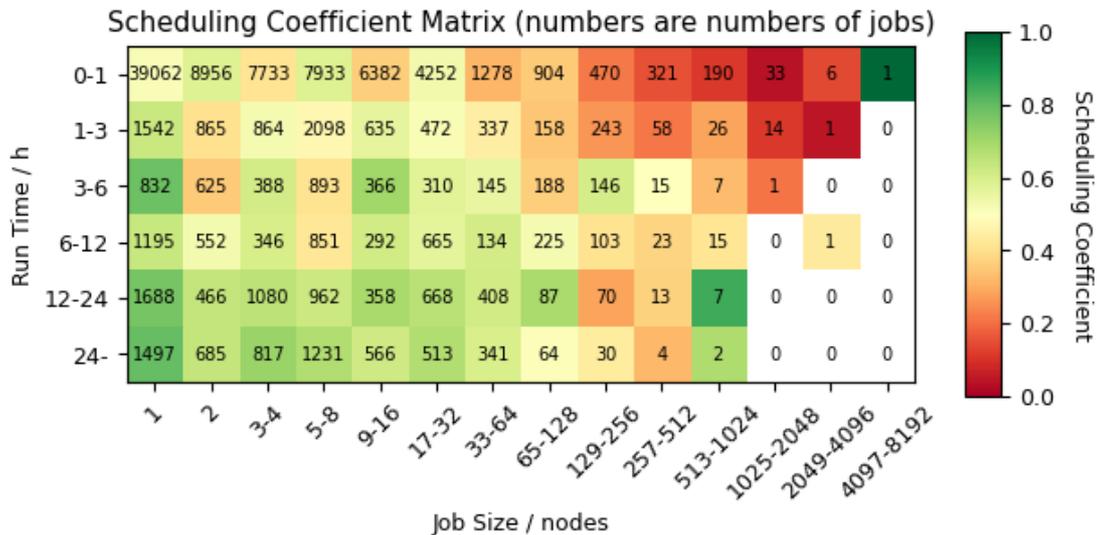
As previously noted, the UK National Service switched from ARCHER2 4-Cabinet system to ARCHER2 full system on 22nd November. The results above show a combined percentage across the whole quarter but there is a large uncharged usage as the ARCHER2 full system was uncharged from 22nd November – 31st December.

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. As may be expected, the system is busy and users are having to queue for longer than previously. Measures were introduced to try to alleviate the queue such as limiting the large, long jobs and placing limits on the number of jobs that one user can run at any time.

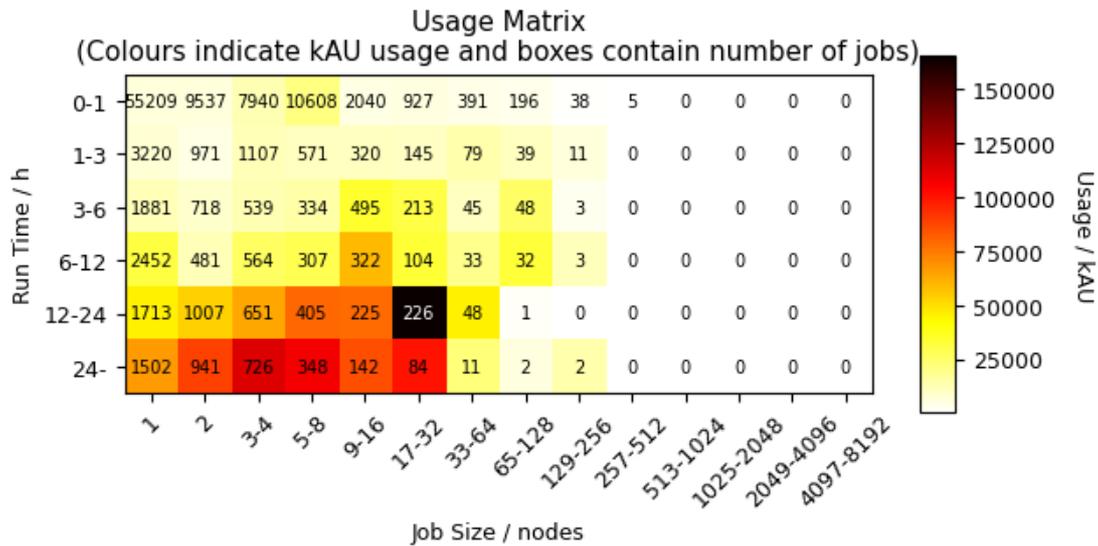


This shows the Scheduling Coefficient for the ARCHER2 4-Cabinet system from 1st October – 22nd November.

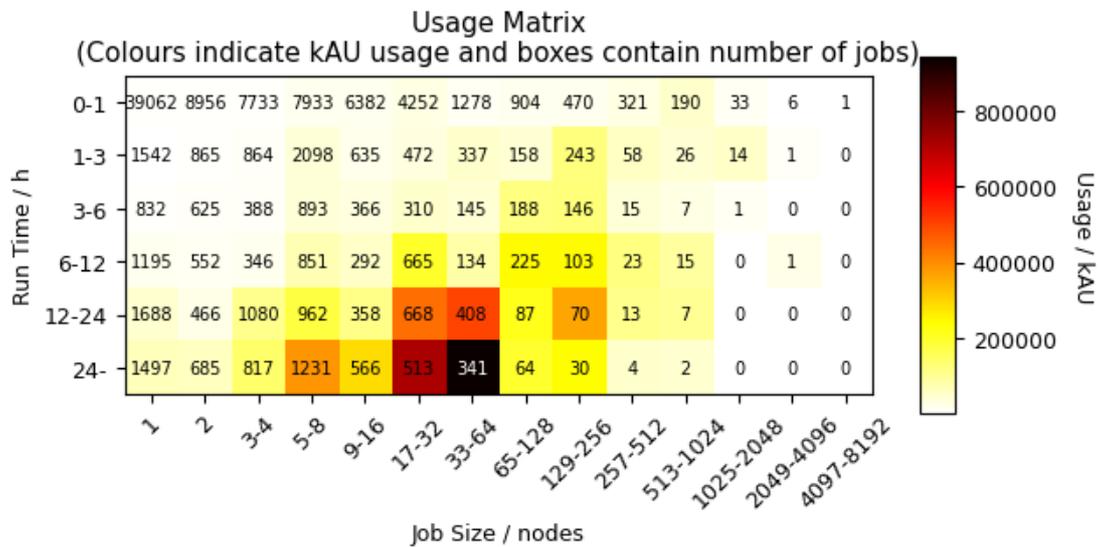


This shows the Scheduling Coefficient for the ARCHER2 full system from 22nd November – 31st December.

The usage heatmap below provides an overview of the usage on ARCHER2 over the quarter for different job sizes/lengths. The colour in the heatmap indicates the number of CUs expended for each class, and the number in the box is the number of jobs of that class.



This shows the Usage Matrix for the ARCHER2 4-Cabinet system from 1st October – 22nd November.



This shows the Usage Matrix for the ARCHER2 full system from 22nd November – 31st December.