ARCHER2
SP Quarterly Report

January – March 2023

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	24/03/2023	Template created	Jo Beech-Brandt
0.2	03/04/2023	Added feedback info	Anne Whiting
0.3	03/04/2023	Added contractual information, graphs and narrative	Jo Beech-Brandt
0.4	04/04/2023	Added heatmaps and narrative	Clair Barrass, Andy Turner, Kieran Leach, Paul Clark
0.5	10/04/2023	Complete draft	Jo Beech-Brandt
0.7	10/04/2023	Review	Alan Simpson
1.0	13/04/2023	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 January – 31st March 2023.

1.1 Service Highlights

- A total of 102 user feedback responses were received to SP queries. Of these 75% were rated excellent, 8% very good and 17% good. A donation of £195 (£102 from SP, £93 from CSE) was made to our chosen charity, Save the Children, a pound for each piece of feedback received.

- The Test and Development System (TDS) was upgraded to Papaya+ in anticipation of the software upgrade of the main system. System configuration has now been deployed by EPCC.

- We have successfully raised the temperature of water supplied to the ARCHER2 CDUs to 24˚C in support of efforts to increase the level of "free cooling" and the energy savings this should support.

- Consortium test users are currently on the TDS to allow them to test their codes ahead of the full system upgrade. A slack channel has been set up to allow easy communications between the users and the support teams.

- Voltage monitoring relays replaced in the prC switchgear as part of proactive maintenance to help underpin the ARCHER2 service and help reduce impact of power blips.

1.2 Forward Look

- We are working closely with HPE to further develop the plans for both the TDS and main system operating system upgrade. The TDS work started during Q1 2023 and the main system will be upgraded in Q2 2023.

- ARCHER2 SP staff are presenting and attending the CUG (Cray User Group) Meeting which will be held in Helesinki in May 2023.

- We will continue to work to raise the temperature of water circulated to external fan units in support of efforts to increase the level of "free cooling" and the energy savings this should support. Motorised valve due to be replaced in April to help continue momentum in this space.

- A User Forum is being planned as part of the Major Software Upgrade schedule. The first session will take place during the outage with a follow-on session once the users have access to the upgraded system. These sessions will focus on the changes and the impact that the upgrade will have on the user experience.

2 ARCHER2 Performance Report

This is the contractual performance report for the ARCHER2 SP Service for the Reporting Periods from 1 January 2023 until 31 March 2023.

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: <=96.5%; Operating Service Level: >98.0%, ≤ 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	Jan 2023		Feb 2023		Mar 2023		Q1 2023	
	Perf	Points	Perf	Points	Perf	Points	Perf	Points
Availability	100%	-3	99.5%	-2	100%	-3	**99.8%**	**-8**
SP_Level1 (MTR)	0.00	-2	0.00	-2	0.00	-2	**0.00**	**-6**
SP_Level2 (MTR)	0.05	-2	0.05	-2	0.09	-2	**0.06**	**-6**
SP_Level3 (MTR)	6.34	-2	0.00	-2	6.39	-2	**6.34**	**-6**
Initial Response (%)	100%	-1	100%	-1	100%	-1	**100%**	**-3**
Query Satisfaction (%)	100%	-2	100%	-2	100%	-2	**100%**	**-6**
Total		**-12**		**-11**		**-12**		**-35**

2.1.2 Service Credits

As the Total Service Points are negative (-35), no Service Credits apply in 23Q1.

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.

January 2023					
Service level	**Assigned**	**Resolved**	**Backlog**	**Correspondence**	**First Response**
SP_Level1	5132	5133	0	0.11	0:07:05
SP_Level2	109	103	19	6.33	0:18:52
SP_Level3	1	1	1	7	0:30:25
February 2023					
Service level	**Assigned**	**Resolved**	**Backlog**	**Correspondence**	**First Response**
SP_Level1	4387	4385	2	0.10	0:01:58
SP_Level2	118	106	31	6.84	0:17:15
SP_Level3	1	0	2	0	0:00:00
March 2023					
Service level	**Assigned**	**Resolved**	**Backlog**	**Correspondence**	**First Response**
SP_Level1	2799	2801	0	0.16	0:00:35
SP_Level2	108	111	28	7.76	0:17:28
SP_Level3	1	2	1	11	0:16:16
Q1 2023					
Service level	**Assigned**	**Resolved**	**Backlog**	**Correspondence**	**First Response**
SP_Level1	12318	12319	0	0.12	0:03:57
SP_Level2	335	320	28	6.99	0:17:51
SP_Level3	3	3	1	9.67	0:20:59

2.3 Query Resolution

Metric	**Jan 2023**		**Feb 2023**		**Mar 2023**		**Q1 2023**	
Service Level	**MTR**	**Resolved**	**MTR**	**Resolved**	**MTR**	**Resolved**	**MTR**	**Resolved**
SP_Level1	0:00:41	5133	0:00:31	4385	0:00:38	2801	0:00:39	12319
SP_Level2	0:32:10	103	0:31:57	106	0:55:35	111	0:36:16	320
SP_Level3	63:24:25	1	0:00:00	0	63:52:54	2	63:24:23	3
Total		**5237**		**4491**		**2914**		**12642**

A total of 12642 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 January, there were 35 feedback scores received during this period. 100% were Good, Very Good or Excellent with 63% given the highest score of Excellent.

During February, there were 32 feedback scores received during this period. 100% were Good, Very Good or Excellent with 81% given the highest score of Excellent.

During March, there were 35 feedback scores received during this period. 100% were Good, Very Good or Excellent with 83% given the highest score of Excellent.

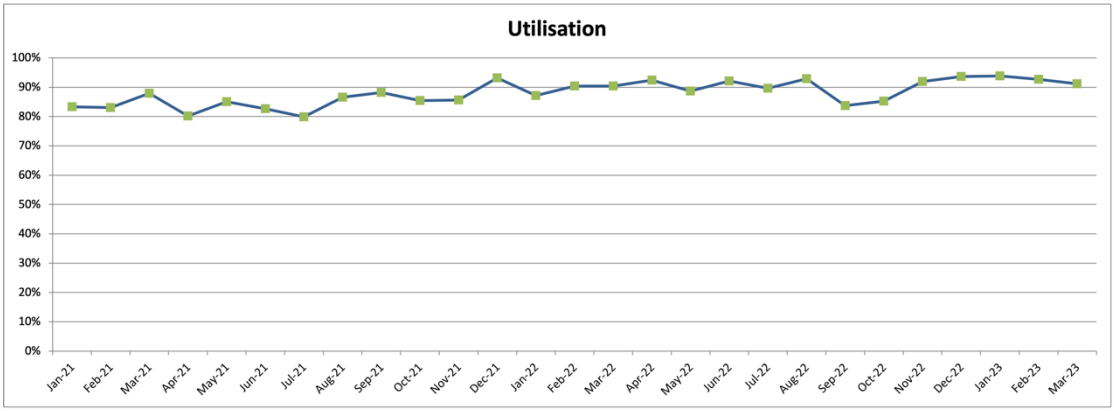
2.5 Maintenance and Outages

Type	Start	End	Duration	User Impact	Reason	Attributable
Unplanned	23/01/23 11:30	23/01/23 15:15	3.75 hrs	Users with directories on fs2 unable to run work	Lustre filesystem component failover in unclean manner	HPE
Unplanned	07/02/23 18:40	08/02/23 15:00	20.33hrs	Unavailability of compute in four cabinets	Power failure in on-site upstream power supply of cabinets	Accommodation
Unplanned	14/02/23 10:15	14/02/23 13:30	3.25 hrs	Users with directories on fs2 unable to run work	Contention on filesystem due to heavy user IO patterns	SP
Unplanned	28/03/23 09:47	28/03/23 19:25	9.63 hrs	Full service outage	Kubernetes management cluster failed during planned maintenance	HPE

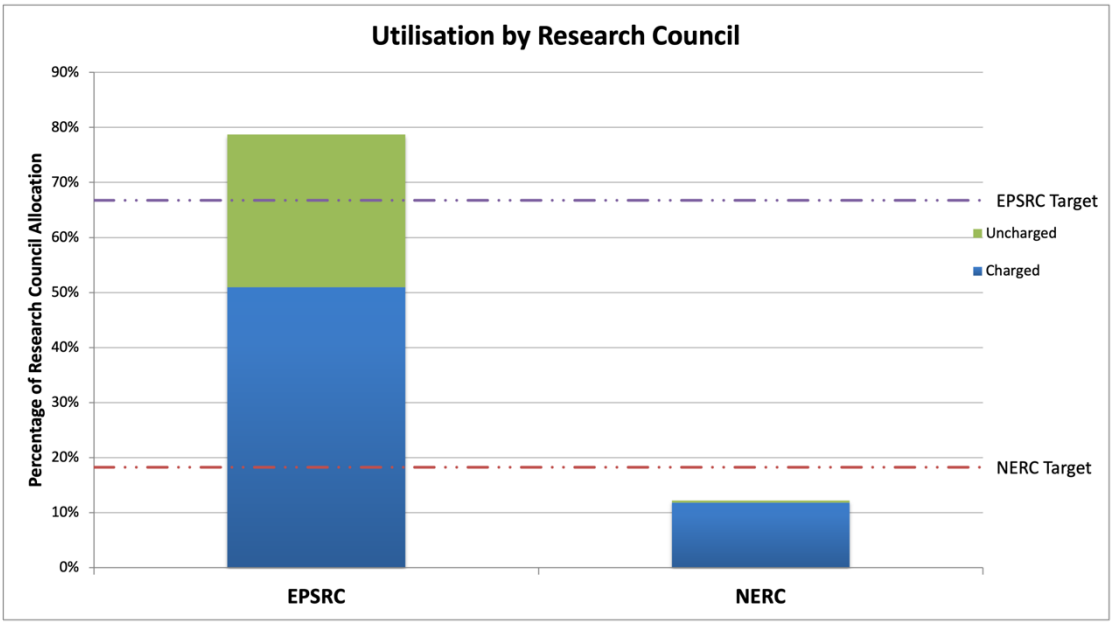
3 ARCHER2 Service Statistics

3.1 Utilisation

Utilisation from 1st January – 31st March is 93% which is slightly increased from 90% the previous quarter. Utilisation for January was 94%, for February 93% and for March 91%.

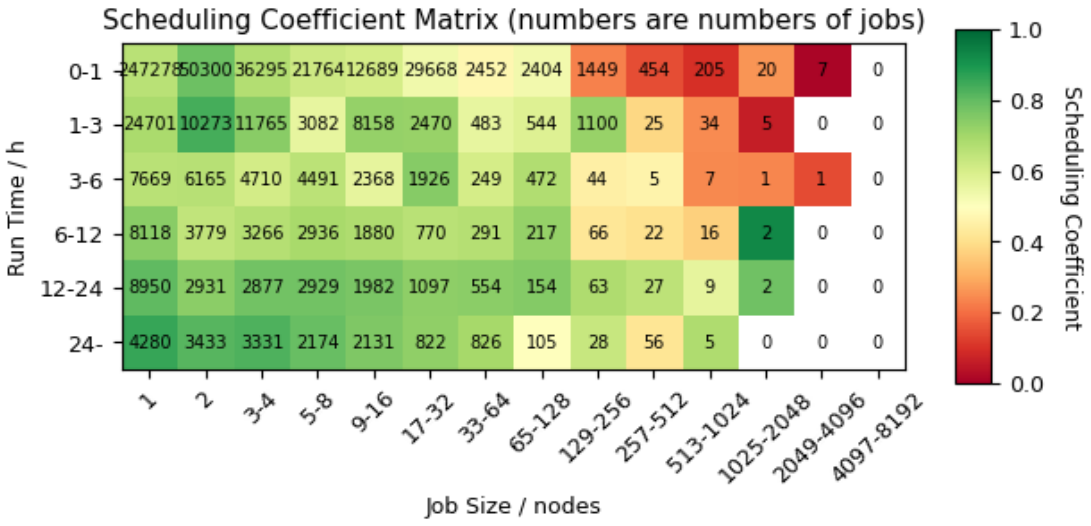


The utilisation by the Research Councils, relative to their respective allocations, is presented below. This bar chart shows the usage of ARCHER2 by the two Research Councils presented as a percentage of the total Research Council allocation on ARCHER2. It can be seen that EPRSC exceeded their target this quarter with their usage being at 83.7% (against their target of 66.8%) but NERC missed their target with utilisation being 11.8% (against their target of 18.2%). It should be noted that the uncharged proportion of the EPSRC usage remains at 28% after decreasing from 45% in 3Q22.



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 very busy and users are having to queue for longer for larger jobs on ARCHER2. 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.



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.