ARCHER2
SP Quarterly Report

January - March 2026

EPCC
The University of Edinburgh

Document Information and Version History

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0.2	03/04/2026	Added narrative, graphs, service statistics	Jo Beech-Brandt
0.3	04/04/2026	Added critical success metrics	Lorna Smith
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1.0	12/04/2026	Version for UKRI	Jo Beech-Brandt, George Beckett

1 The ARCHER2 Service

This is the report for the ARCHER2 SP Service for the Reporting Period: 1 January – 31 March 2026.

1.1 Service Highlights

- Utilisation remains high with the overall utilisation at 94%. The monthly utilisation figures were 96% in January, 96% in February and 89% in March. There was a capability days session during March and that can impact utilisation.

- A hybrid User Forum took place within the annual Celebration of Science event. This allowed ARCHER2 staff to provide updates and also gain feedback directly from ARCHER2 users. Sessions included a management overview, user survey report, training forum and a session on GPU architectures and a case study of porting a code from CPU to GPU architecture.

- Capability days took place in March to allow users the opportunity to test and run codes at large scale. A report of recent capability days was presented at the User Advisory Group meeting. Further capability days will be planned before the end of the service and will increase in frequency towards the end of the service.

- EPCC is working towards ISO 14001, the internationally recognised environmental management standard for the ACF datacentre, as we aim to minimise the environmental impact of running the datacentre. An initial exploratory session was held with an ISO consultant to scope out the work required and to plan for the implementation.

1.2 Forward Look

- EPCC will work with EPSRC, NERC and HPE for the exit plans for the ARCHER2 service. The end date of the ARCHER2 service is 21st November 2026. EPCC will be working closely with UKRI to ensure timely, accurate messaging is sent to users.

- There will be additional capability days over the remainder of the lifetime of the ARCHER2 service including one planned for May. This will allow users the opportunity to test and run codes at large scale.

- Final testing is taking place for a new image on the GPU nodes. Once this has been fully tested, it will be rolled out onto the GPU nodes and users will be able to benefit from the newer software on the nodes.

- Recruitment has started for the ACF summer internship program where students from the School of Engineering are given the opportunity for paid work with us for 12 weeks. Via the formal Employ.ed scheme, this is our third summer and offers an insight into running a large, complex, world leading supercomputing data centre.

- Over the past ten years, EPCC has also led on early career opportunities for third-year Undergraduate computing students, and this summer, we will again offer two positions to students from Napier University. Interviews will take place in early May, and students will start with us over the summer period for one year. Additionally, we will extend our Graduate Apprenticeship (GA) programme this year by offering two positions to our existing undergraduate students to transition onto the two-year GA programme.

- EPCC continue to work with HPE towards the deployment of a server running "View for Clusterstor" software. This should enable better understanding of work file system performance and a more immediate ability to identify the origin of problems on work file systems. EPCC have configured and provided a server for HPE to use for this deployment and HPE aims to get this software running during 2Q2026. .

- EPCC have also been working closely with HPE to implement PowerSched on ARCHER2. Following initial testing, HLRS developers proposed changes to both the software and the configuration, and these changes have now been implemented. A second round of PowerSched performance testing is currently underway, including a test of PowerSched's ability to cap power draw, initially testing on a single chassis.

- Additional meetings have taken place with the University of Edinburgh estates team. They are working with us to conduct a site review. This will involves reviewing critical works before looking at the cooling infrastructure across the site which we have highlighted as a priority, given weather trends. There is an expectation of increased temperatures during summer periods and in view of this we are planning to make changes ahead of the hot weather to hopefully mitigate issues to services and supporting plant.

- Further work will be carried out to explore what is needed for the ISO 14001 certification, the international standard for environmental management. This provides a framework for organisations to manage their environmental responsibilities, reduce impact (for example, waste, energy use, pollutants), ensure legal compliance, and continuously improve their environmental performance. This is particularly relevant for the ACF datacentre where we

want to ensure we minimise the potential environmental impact of running such a resource intensive site.

- EPCC are preparing for our annual ISO external audit in June, when an external auditor ensures that EPCC continues to apply best practice and complies with the ISO 9001 (quality service delivery), ISO 27001 (information security) and ISO 22301 (business continuity and disaster recovery) standards. The considerable time and effort EPCC spend correlates with the importance we place on ensuring we run the best service for our users and keep user data and services as safe as possible whilst minimising service disruption.

- EPCC are continuing to work to integrate file system awareness into the Slurm scheduler, in order to allow individual file systems to be taken down for maintenance with less impact to users. This should reduce the overall unavailability for users of specific file systems to only the specific time where maintenance is conducted.

2 ARCHER2 Performance Report

This is the contractual performance report for the ARCHER2 SP Service for the Reporting Periods from 1 January until 31 March 2026.

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 2026		Feb 2026		Mar 2026		Q1 2026	
	Perf	Points	Perf	Points	Perf	Points	Perf	Points
Availability	100%	-3	100%	-3	100%	-3	100%	**-9**
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)	0.22	-2	0.00	-2	0.00	-2	**0.22**	**-6**
Initial Response (%)	100%	-1	100%	-1	100%	-1	**100%**	**-3**
Query Satisfaction (%)	100%	-2	100%	-2	100%	-2	**100%**	**-6**
Total		**-12**		**-12**		**-12**		**-36**

2.1.2 Service Credits

As the Total Service Points are negative (-36.0), no Service Credits apply in 1Q26.

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 2026					
Service level	**Assigned**	**Resolved**	**Backlog**	**Correspondence**	**First Response**
SP_Level1	5443	5443	0	0.073	0:00:55
SP_Level2	84	86	19	7.198	0:14:57
SP_Level3	1	1	0	5	0:02:05
February 2026					
Service level	**Assigned**	**Resolved**	**Backlog**	**Correspondence**	**First Response**
SP_Level1	3109	3109	0	0.121	0:01:33
SP_Level2	81	83	17	6.554	0:19:34
SP_Level3	0	0	0	0	0:00:00
March 2026					
Service level	**Assigned**	**Resolved**	**Backlog**	**Correspondence**	**First Response**
SP_Level1	3041	3041	0	0.142	0:01:27
SP_Level2	151	149	19	6.792	0:15:17
SP_Level3	0	0	0	0	0:00:00
Q1 2026					
Service level	**Assigned**	**Resolved**	**Backlog**	**Correspondence**	**First Response**
SP_Level1	11593	11593	0	0.104	0:01:15
SP_Level2	316	318	19	6,84	0:16:19
SP_Level3	1	1	0	5	0:02:05

2.3 Query Resolution

Metric	**Jan 2026**		**Feb 2026**		**Mar 2026**		**Q1 2026**	
Service Level	**MTR**	**Resolved**	**MTR**	**Resolved**	**MTR**	**Resolved**	**MTR**	**Resolved**
SP_Level1	0:00:23	5443	0:00:30	3109	0:00:24	3041	0:00:24	11593
SP_Level2	0:32:59	86	0:30:36	83	0:52:05	149	0:38:04	318
SP_Level3	2:14:44	1	0:00:00	0	0:00:00	0	2:14:44	1
Total		**5530**		**3192**		**3190**		**11912**

A total of 11,912 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 30 feedback scores received. 100% were Good, Very Good or Excellent with 80% given the highest score of Excellent.

During February, there were 21 feedback scores received. 100% were Good, Very Good or Excellent with 81% given the highest score of Excellent.

During March, there were 36 feedback scores received. 100% were Good, Very Good or Excellent with 97.2% given the highest score of Excellent.

An £87 donation was made to our chosen charity Save the Children with £1 donated per query feedback item received.

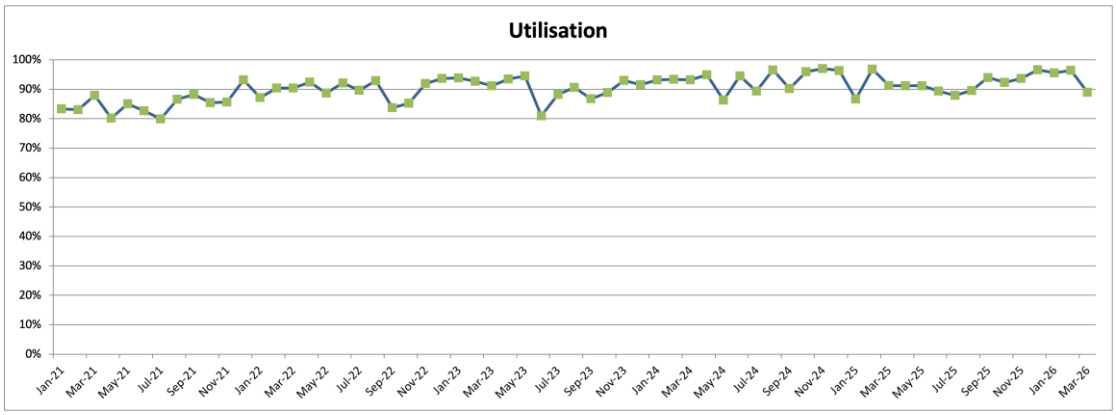
2.5 Maintenance and Outages

Type	Start	End	Duration	User Impact	Reason	Attributable
Partial	2026-02-02 1345	2026-02-02 1430	45 mins	New and pending jobs will remain queued. Users can login, access data and submit jobs.	Issue with cooling pump	Accommodation
Partial	2026-02-10 1600	2026-02-11 1255	20 hrs 55mins	New work was prevented from starting. Users can login, access data and submit jobs.	Issue with cooling pump	Accommodation
Partial	2026-03-04 1530	2026-03-04 1645	1 hr 15 mins	Projects on filesystem /work3 will not be able to submit jobs and recent jobs may have failed	Failover issues on one of the four /work filesystems	HPE
Full	2026-03-10 0800	2026-03-11 0950	25 hrs 50 mins	ARCHER2 service closed to users	Certificate update	HPE

3 ARCHER2 Service Statistics

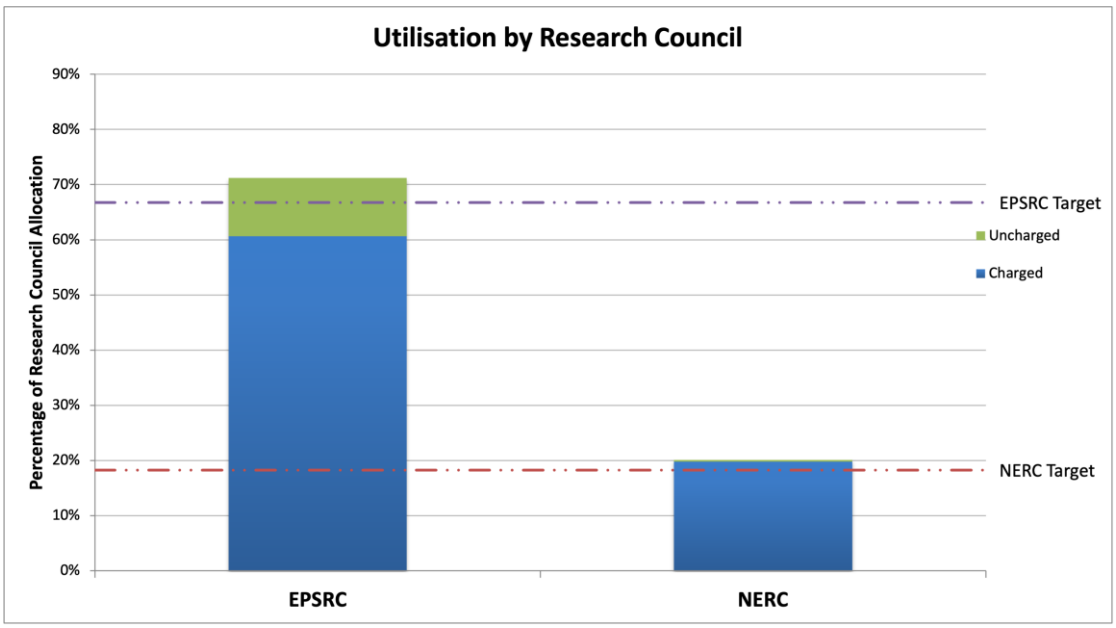
3.1 Utilisation

The utilisation for ARCHER2 remains high for 1 January – 31 March at 94% which was the same as last quarter. Utilisation for January was 96%, for February 96% and for March 89%. There were capability days during March and that can impact the utilisation.

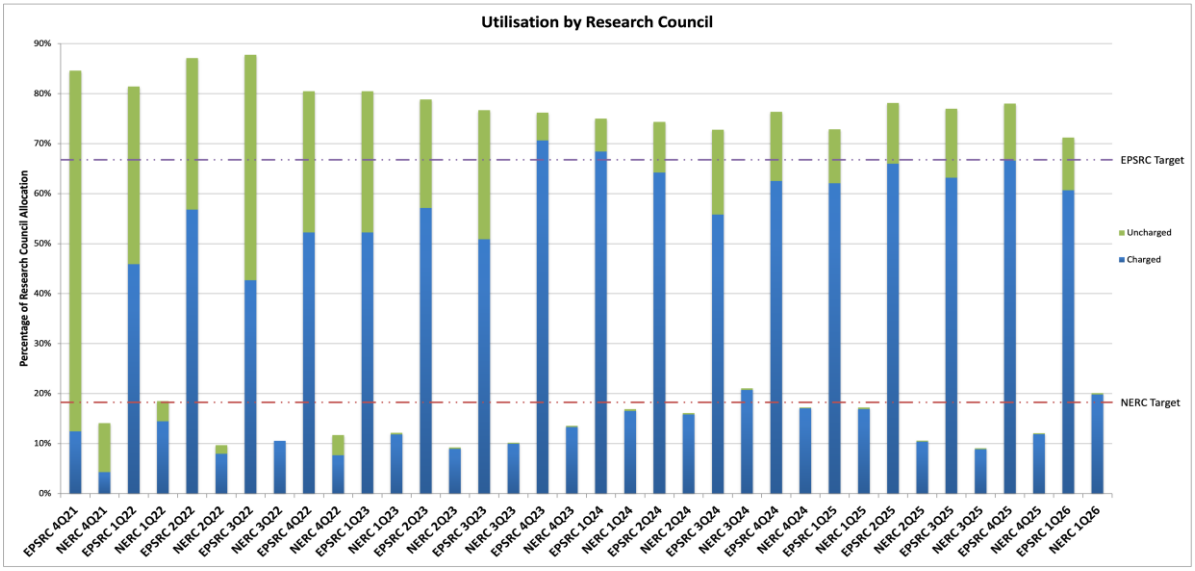


The utilisation by the Research Councils, relative to their respective allocations, is presented below. This bar chart shows the usage of ARCHER2 by the two Research Councils presented as a percentage of the total Research Council allocation on ARCHER2. It can be seen that EPSRC exceeded their target this quarter with their usage being at 71% (against their target of 66.8%). It should also be noted that the proportion of EPSRC's uncharged utilisation has decreased further this quarter from 11.4% in 4Q25 to 10.6% in this quarter.

NERC also exceeded their target utilisation of 18.2% with their utilisation increasing from 12% in 4Q25 to 20.1% in 1Q26.

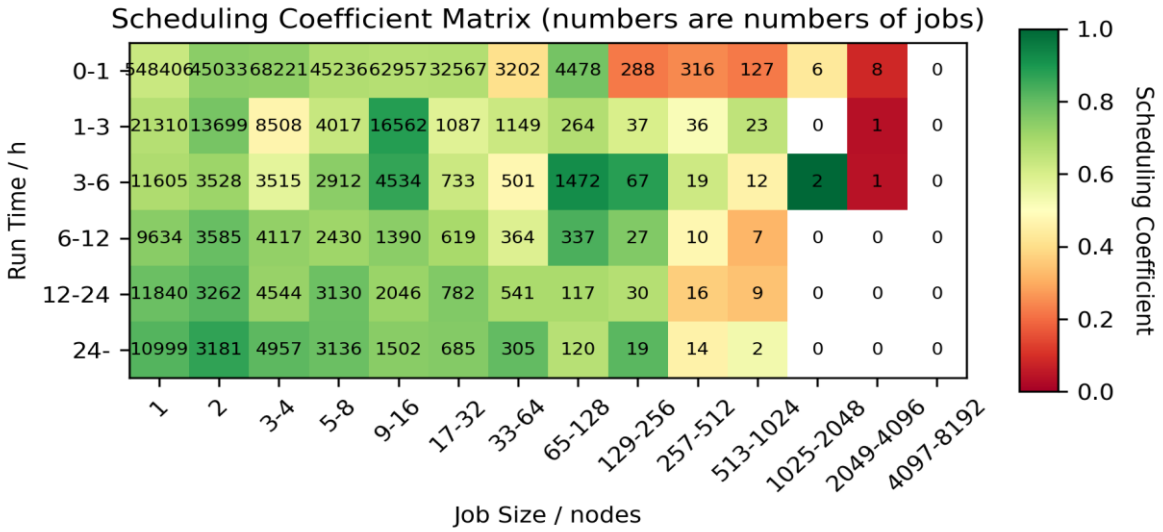


The stacked graph below shows the trend of charged and uncharged utilisation since the start of the service.

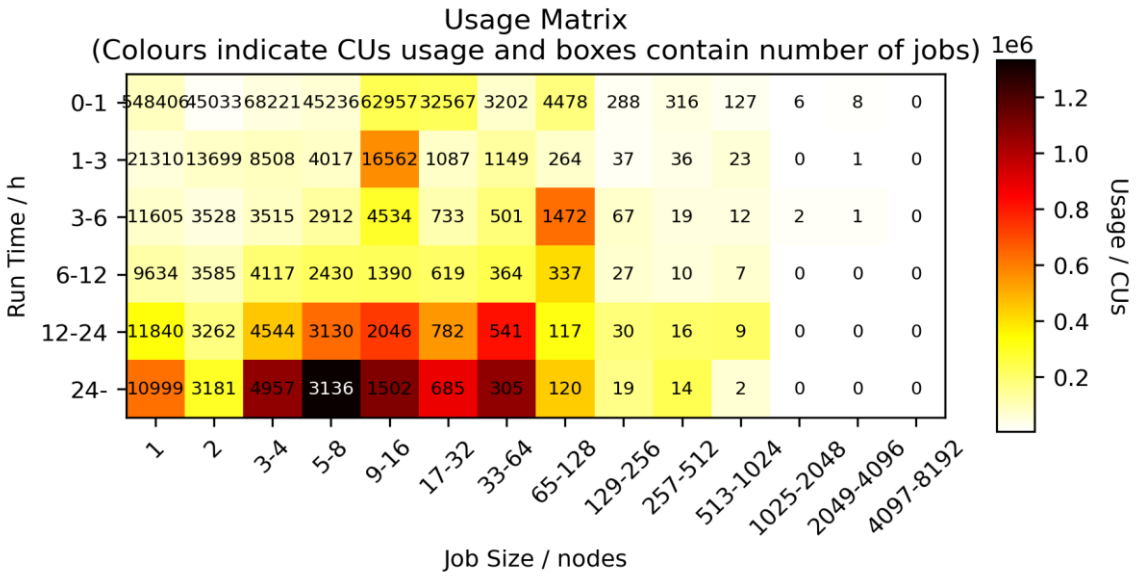


3.2 Scheduling Coefficient Matrix

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.



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.



Appendix: Critical Success Factors

1. Context

EPCC have been asked by UKRI to provide quarterly data for a number of critical success factors:

- CSF04 Implementation of environmentally considerate energy policies
- CSF07 Deliver and maintain a reliable data I/O function
- CSF08 Be cost-effective, cost-efficient and drive towards lowering of operational costs

In the sections below, please find the relevant metrics and data.

2. CSF04 Implementation of environmentally considerate energy policies

Implementation of environmentally considerate energy policies with a drive to reducing costs and environmental impacts.

All electricity provided to the ACF and ARCHER2 is on a 100% green, renewable energy tariff.

Environmentally considerate policies: 4

Since the start of full Service, EPCC have worked on implementing the following policies:

- Move from High Performance Mode to Low Power Mode: reduced average power draw from 3.2 MW to 2.9 MW (9%) with negligible impact on performance [May 2022]
- Reduced default processor frequency: further reduced average power to around 2.5 MW (19%) [December 2022]
- Increase in coolant temperatures: this will result in an increase in passive cooling ("free cooling") [ongoing]
- Developed a set of new tools to help users estimate the environmental impact of their computing simulations and workloads [November 2024]

Power Usage

	4Q 21*	**1Q 22**	**2Q 22**	**3Q 22**	**4Q 22**	**1Q 23**	**2Q 23**	**3Q 23**	**4Q 23**
Average Power	3.31	3.16	3.15	2.86	2.90	2.51	2.56	2.46	2.53
	1Q 24	**2Q 24**	**3Q 24**	**4Q 24**	**1Q 25**	**2Q 25**	**3Q 25****	**4Q25****	**1Q26**
Average Power	2.58	2.54	2.64	2.57	2.55	2.55	2.52	2.54	2.53

* Partial

**Does not include period of site downtime

So far, the average power draw has been reduced by around 0.7MW (21%) which will reduce electricity usage by up to 6M kWh per annum, significantly reducing annual running costs.

3. CSF07 Deliver and maintain a reliable data I/O function

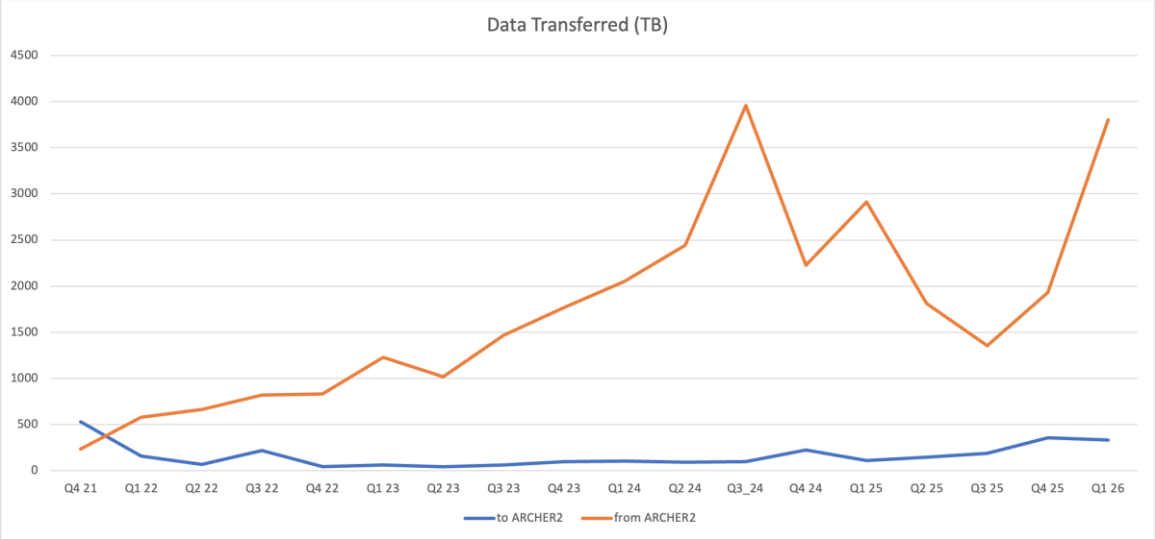
The compute resource will deliver and maintain an efficient, effective and reliable data I/O function which meets the requirements of users and their software. It will evolve and expand to accommodate new software or hardware architectures as required by the Service or its user base.

Data Transferred

EPCC monitor the data transfer rates in and out of the ARCHER2 system. Based on this, we now estimate the total amount of data transferred on and off ARCHER2 each Quarter.

Data Transferred…	**4Q21***	**1Q22**	**2Q22**	**3Q22**	**4Q22**	**1Q23**	**2Q23**	**3Q23**	**4Q23**
…to ARCHER2 (TB)	534	163	68	220	44	67	42	65	99
…**from**ARCHER2(TB)	236	582	667	822	834	1231	1022	1472	1771
Data Transferred…	**1Q24**	**2Q24**	**3Q24**	**4Q24**	**1Q25**	**2Q25**	**3Q25**	**4Q25**	**1Q26**
…**to** ARCHER2 (TB)	108	93	98	228	114	150	191	361	335
…**from** ARCHER2(TB)	2056	2443	3956	2227	2915	1815	1359	1934	3802

* Partial



The amount of data moved off ARCHER2 has increased from the previous quarter.

Parallel IO write performance

We regularly monitor the parallel write performance between the compute nodes and the parallel Lustre (/work) file systems. We use the benchio synthetic IO benchmark application[1] and report the MPI-IO write performance with the following settings:

- Global data structure of 2048^3: writes a single file of 65,536 MiB (64 GiB).
- Uses 16 compute nodes and 128 MPI processes per node.
- Uses UCX as the MPI transport protocol.
- Sets the following environment variables:
    - FI_OFI_RXM_SAR_LIMIT=64K
    - MPICH_MPIIO_HINTS="*:cray_cb_write_lock_mode=2,*:cray_cb_nodes_multiplier=4"

These settings have been found to maximise the IO performance for parallel writes using MPI-IO on the ARCHER2 file systems. Writes using the default settings on ARCHER2 typically have median write values 2-3 GiB/s lower than the optimised values.

Original reporting of this data (Q1 and Q2 2023) used the means from a small number of runs on the HDD-based Lustre file systems. From Q3 2023 onwards we have been monitoring performance regularly on both HDD and NVMe-based Lustre file systems throughout the quarter and report median (Q2) and lower (Q1) and upper quartile (Q3) performance and provide boxplots illustrating the performance variation. (On the boxplots, the green triangles mark the mean value and the whiskers extend to the last datapoint within the range 1.5 x IQR.)

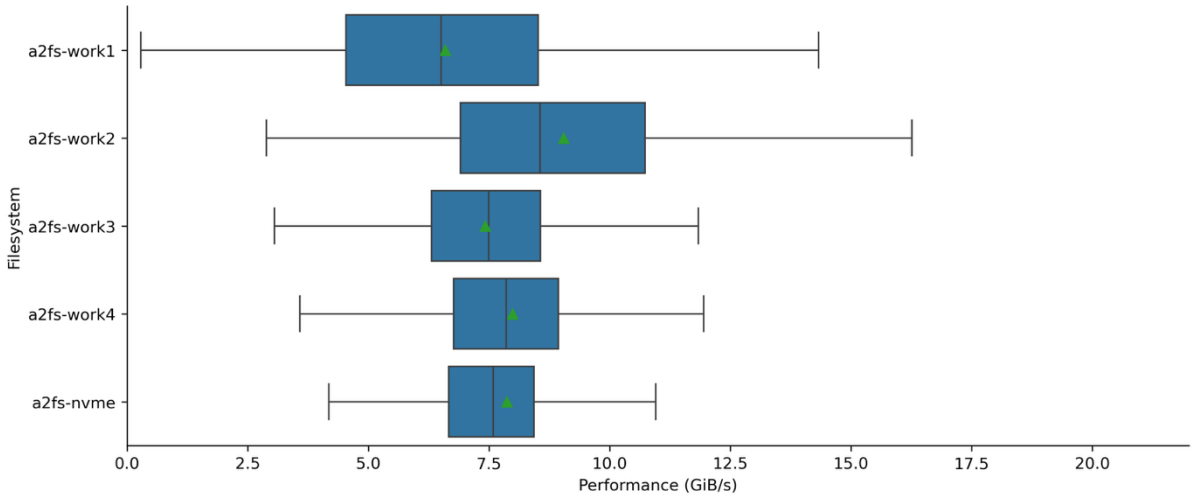
During Q1 2025, we have worked to remove data from a2fs-work1 as much as possible. With the usage of the file system now below 80% we see a significant improvement in performance compared to Q4 2024 where the usage on the file system was over 80%. We are working to ensure that usage on any of the ARCHER2 Lustre file systems does not go above 80% to try to maintain good performance for users on the service.

Lower performance of a2fs-work1 during 4Q 2024 and 4Q 2025 are both attributed to usage levels moving close to or beyond 80% of total file system capacity leading to less efficient data storage.

[1] https://github.com/davidhenty/benchio

Benchio MPI-IO medium (GiB/s)	1Q23	2Q23		3Q23	4Q23	1Q24	2Q24	3Q24	4Q24
a2fs-work1	8.2	7.6±0.5		10.5 (8.8:11.8)	10.9 (8.3:12.5)		10.1 (7.0:11.8)	9.7 (6.7:11.9)	4.0 (2.0:9.6)
a2fs-work2	8.5	7.3±0.6		10.4 (7.2:12.4)	10.4 (7.7:13.0)		11.1 (8.0:12.5)	11.1 (8.1:13.1)	11.3 (7.1:15.0)
a2fs-work3	8.3	9.6±0.7		10.0 (8.2:11.6)	10.7 (8.1:11.9)		9.6 (8.4:11.8)	9.6 (7.5:11.8)	9.3 (7.0:11.6)
a2fs-work4					9.7 (9.1:10.2)		10.0 (9.2:10.8)	10.6 (9.4:11.6)	10.7 (9.5:11.7)
a2fs-nvme				10.1 (9.6:11.5)	10.1 (9.5:12.4)		11.1 (10.5:12.4)	11.6 (11.1:12.7)	10.7 (10.0:11.8)

Benchio MPI-IO medium (GiB/s)	1Q25	2Q25	3Q25	4Q25	1Q26
a2fs-work1	8.6 (5.0:11.1)	8.6 (6.4:11.7)	7.5 (4.9:9.7)	3.9 (2.0:6.8)	6.5 (4.5:8.5)
a2fs-work2	10.7 (8.1:12.7)	11.4 (8.9:12.6)	10.3 (8.1:12.0)	8.6 (7.0:10.9)	8.6 (6.9:10.7)
a2fs-work3	9.3 (7.7:11.6)	9.5 (7.3:11.7)	8.8 (7.2:10.6)	7.6 (6.1:8.8)	7.5 (6.3:8.6)
a2fs-work4	10.1 (8.8:10.9)	10.5 (9.0:11.3)	9.5 (7.8:10.5)	7.8 (6.8:8.6)	7.9 (6.8:8.9)
a2fs-nvme	11.3 (10.4:13.3)	11.0 (10.4:13.5)	10.9 (10.4:13.1)	8.3 (7.9:9.6)	7.6 (6.7:8.4)



4. CSF08 Be cost-effective, cost-efficient and drive towards lowering of operational costs

The Service shall be cost-effective and cost-efficient across its elements during its lifetime and drive towards lowering of operational costs by seeking efficiencies in delivery such that TCO presents an acceptable and cost-effective solution for the public. The Service will monitor and report its Power Usage Effectiveness (PUE) and strive to make efficiency savings where possible.

Relative Research Output

Measure	11/2021 – /2022	5/2022 – 12/2022	01/2023 – 12/2023	1Q 24	2Q 24	3Q 24	4Q 24
Relative Research Output per kWh	100	109	115	115	115	115	115
Measure	1Q 25	2Q 25	3Q 25	4Q25	1Q26		
Relative Research Output per kWh	115	115	115	115	115		

We define the initial measure of research output per KWh on ARCHER2 to be 100 and then estimate how this has changed with the introduction of the various environmentally considerate policies discussed under CSF04. This is estimated using applications benchmarks similar to those defined by UKRI for the procurement.

Energy Used per CU Delivered

	4Q21*	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	1Q24	2Q24	3Q24	4Q24	1Q25	2Q25	3Q25	4Q25
Energy per CU (kWh)	0.719	0.713	0.728	0.715	0.650	0.545	0.669	0.590	0.568	0.582	0.585	0.595	0.546	0.518	0.578	0.638	0.620

Energy Cost per CU Delivered

	4Q21*	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	1Q24	2Q24	3Q24	4Q24	1Q25	2Q25	3Q25	4Q25
Cost per CU (£)	£0.089	£0.090	£0.098	£0.096	£0.088	£0.074	£0.162	£0.143	£0.136	£0.140	£0.160	£0.164	£0.149	£0.142	£0.131	£0.139	£0.134

* Partial

The two tables above are calculated using the total CUs delivered by ARCHER2, the total kWh of electricity consumed, and the unit cost for kWh. The increase in “Energy Cost per CU Delivered” from 2Q23 is caused by a significant increase in the unit cost of electricity from April 2023. For 2Q23, there is also an impact on the “Energy Used per CU Delivered” from the major software upgrade that took 3 weeks. There was also an additional increase in the unit cost of electricity from April 2024.