ARCHER2 Quarterly Report

October–December 2025

EPCC

The University of Edinburgh

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ARCHER 2 Quarterly Report

This section of the report covers the period October 2025–December 2025 for the ARCHER2 service.

ARCHER2 Executive Summary

- The wrap-up of the ARCHER2 Software Update project was a priority for CSE during the early part of the quarter. The roll-out of the software update was successful, in part due to the thorough testing undertaken by CSE.

- A review of the Centrally Supported Software on ARCHER2 was carried out in November. These reviews are carried out periodically aiming to improve the currency and usefulness of the scientific tools and applications on the service.

- We EPCC have been accepted as one of 13 exhibitors for the Royal Society Summer Science Exhibition in 2026, this will provide an interactive exhibit based around the value and sustainability of supercomputing. The VR exhibit will fe based around science examples from ARCHER2.

- Planning is well underway for the ARCHER2 Celebration of Science in March.

- The ARCHER2 CSE service was represented at SC25 (in St Louis, Missouri in November) by James Richings and Eleanor Broadway. James contributed to a panel session at the Research Software Engineers in HPC session and a talk on Green HPC at a birds-of-a-feather session. Eleanor contributed to a comprehensive programme of EDI activities led by Women in HPC including contributing to a workshop, chairing a lightning talk session, and delivering a birds-of-a-feather session.

- CSE undertook a detailed study of the performance and energy-efficiency impacts of PowerSched, a tool that enables the power draw to be capped and for the node-level power settings to be dynamically optimised. Results for some of the most important ARCHER2 scientific codes were mixed, with PowerSched performing well in some instances but also behaving unexpectedly for other (especially complex) workflows.

- Twelve days of training have been delivered this Quarter as part of the ARCHER2 CSE training programme with particularly strong engagement in "Parallel Python" and "JAX for Scientific Computing".

- CSE Consortium Contacts continue to engage with consortia, with contacts participating in the NERC Digital Gathering and in the UKCOMES annual meeting.

- We are continuing to collect final reports from completed ARCHER2 eCSE projects and putting summaries online. Five projects are still ongoing, and all should be finished by August 2026. All 12 GPU eCSE projects remain ongoing.

- The image competition was very successful this year, with 30 entries. The images were used to create the ARCHER2 calendar for 2026 and will be used to source potential case studies, webinars, and blogs.

ARCHER2 Forward Look

- The ARCHER2 Celebration of Science will be held during 19th–20th March 2026. There will be a poster session with lightning talks as well as a series of invited science talks.

- The Outreach team will be preparing for the Royal Exhibition in June, as well as for the Edinburgh Science Festival in April. This will involve staff training and exhibit preparation.

- Supported by CSE, the HPE Centre of Excellence will deliver a training course and host several webinars to support the ARCHER2 user community in the coming quarter.

- The ARCHER2 Celebration of Science will be held during 19th–20th March 2026. There will be a poster session with lightning talks as well as a series of invited science talks.

- The work on PowerSched will continue during this quarter with a second round of performance testing being undertaken in collaboration with HPE and HLRS during January and February.

- A refresh of the ARCHER2 Centrally Supported Software will be completed in January.

ARCHER2 Centralised CSE Team

This has been another productive period for the CSE team with a mix of technical work, science support, and community engagement, highlights of which are presented below.

Several EPSRC High-End Consortia/ NERC Consortia held their annual meetings during the period and CSE Consortium Contacts were actively involved in these:
- Michael Bareford contributed to the NERC Digital Gathering (Cranfield University, 9th October). As well as representing the ARCHER2 service, Michael presented work—jointly undertaken with the British Geological Survey—on "Optimising the computational performance of high-degree lithospheric models" which is expected to be published in the Computers and Geosciences journal in the New Year (https://www.sciencedirect.com/science/article/pii/S0098300425002420).
- Kevin Stratford attended the UKCOMES annual meeting (UCL, 10th—11th December), presenting an update on the status and 2026 plans for the ARCHER2 service.

The most prominent event on the scientific-computing calendar in the period was the annual Supercomputing conference which, this year, was held in St Louis, Missouri, during 16th—21st November. The ARCHER2 CSE service was represented by James Richings and Eleanor Broadway. Eleanor also contributed to various EDI activities, within Women In HPC, which are discussed later in the report.

James participated in a panel discussion at the Research Software Engineers in HPC session (https://sc25.conference-program.com/session/?sess=sess234) presenting a brief overview of RSE skills training in the UK context and highlighting a number of the UK DRI programs that have been established in the past year, especially highlighting CAKE (https://www.cake.ac.uk/) in its role to enable knowledge transfer and to support UK groups to work with international organisations.

James also contributed a talk, on behalf of Andrew Turner, on Green HPC, as part of the "Scientific Software and the People Who Make It Happen: Building Our Communities and Practices" birds-of-a-feather session (https://sc25.conference-program.com/presentation/?id=bof123&sess=sess465).

Finally, looking to the future, James engaged with vendor partners from both Nvidia and AMD. He attended he Nvidia User Group meeting – being established by like-minded academic institutes across the globe who have adopted Nvidia hardware for their research problems. The group is looking to establish a regular contact mechanism, to promote the needs of the HPC community, to share experiences of common technology challenges, and to gather feedback from user communities. On the AMD side, members of the UK AMD team — who now regularly visit EPCC — were present and were able to discuss their roadmaps and introduce members of their US teams.

Closer to home, the ARCHER2 CSE team were well-represented at the UKRI DRI Congress (Leeds, 21st—22nd October) and CIUK (Manchester, 4th—5th December). George Beckett, Jo Beech-Brand, Eleanor Broadway, Xu Guo, Adrian Jackson, and James Richings participated in the DRI Congress, representing different aspects of the ARCHER2 community and sharing their experience of supporting capability-scale scientific computing. EPCC ran a booth at CIUK, showcasing the ARCHER2 and Cirrus service, and engaging with the scientific-computing community.

Continual Service Improvement (CSI) Projects and other activities

Software Update Contributions
The wrap-up of the ARCHER2 Software Update project was a priority for CSE during the early part of the quarter. After an extended period of CSE testing throughout the middle of 2025, a new software image was agreed and deployed by HPE on 20th October. The HPE-led roll-out was very successful, in part thanks to the thorough testing undertaken by CSE: despite its complexity, the deployment went smoothly, reinstating for users a supported version of the host operating system.

A minor issue, related to the configuration of several scientific libraries, was spotted after the roll-out and then quickly addressed by CSE. As part of lessons learned, a new test has been added to the Reframe test suite to prevent a future regression of this.

Centrally Supported Software Review

In November, following on from the successful completion of the Software Update project, the CSE team initiated a review of the Centrally Supported Software on ARCHER2. This is something done periodically (typically, annually), in conjunction with Consortium Contacts and Code Contacts, aiming to maintain the currency and usefulness of the scientific tools and applications on the service. The review has identified several changes, which will be relayed to the ARCHER2 Change Advisory Board and released in January 2026.

Spack Package Management System Upgrade

In part thanks to work done to prepare for EPCC's updated Cirrus service, the CSE team were able to complete a major update to the Spack Package Management system on ARCHER2.

In July, the Spack developers realised an important milestone, releasing Version 1.0 of the toolkit. As well as signifying a maturation of the development model for Spack, this milestone also signalled a move to a more stable user experience, making it easier for CSE to maintain the toolkit and to support users. Following successful testing on Cirrus, the ARCHER2 instance of Spack was upgraded to Version 1.0 during December.

CSE expect to increase use of Spack as part of the supported-software refresh, noted above.

PowerSched Evaluation

As a reminder, PowerSched is a tool developed by HPE and colleagues at the HLRS supercomputing centre in Stuttgart, Germany, to enable the power draw of a Cray EX system to be capped and for the node-level power settings to be dynamically optimised, based on the properties of each specific job.

Following a successful (functional) trial on the ARCHER2 TDS by CSE, HPE staff deployed a version onto the main ARCHER2 service for the second stage of testing (focused on performance and utility). This required some development work from HPE staff, to address differences between the HLRS service and ARCHER2, which was completed in September.

During October and early November, CSE undertook a detailed study of the performance and energy-efficiency impacts of PowerSched, when enabled for some of the most important ARCHER2 scientific codes. Results were mixed, with PowerSched performing well in some instances but also behaving unexpectedly for other (especially complex) workflows.

CSE's findings were presented to the lead developers from HLRS at a meeting organised by HPE on 10th November. The developers proposed some changes to PowerSched (both software and configuration changes), and these were implemented by HPE staff during November—December. A round of retesting will be conducted by CSE in the New Year.

ARCHER2 Performance Report

This is the performance report for the ARCHER2 CSE Service for the Reporting Periods from October 2025–December 2025.

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

CSE Query Metrics

- **ARCHER2_CSE_Level1 (MTR)**: The Median Time to Resolution, as measured by Working Days (WDs), of all CSE queries falling within Level 1 resolved by the Contractor in the Reporting Period. *MTR applicable to OY5: Service Threshold: >4 WD; Operating Service Level: >1 WD, ≤2 WD.*
- **ARCHER2_CSE_Level2 (MTR)**: The Median Time to Resolution, as measured by Working Days (WD), of all CSE queries falling within Level 2 resolved by the Contractor in the Reporting Period. *MTR applicable to OY5: Service Threshold: >25 Working Days (WD); Operating Service Level: >10 WD, ≤15 WD.*
- **ARCHER2_CSE_Level3 (MTR)**: The Median Time to Resolution, as measured by Working Days (WD), of all CSE queries falling within Level 3 resolved by the Contractor in the Reporting Period. *MTR applicable to OY5: Service Threshold: >55 Working Days (WD); Operating Service Level: >25 WD, ≤35 WD.*
- **ARCHER2_CSE_TA (%):** The percentage of the total number of Technical Assessments (TAs) assigned to the Contractor in the Reporting Period completed prior to the commencement of the applicable TA Target Completion Date after the assignment of such Technical Assessment to the Contractor. *TA Target Completion Date in OY5: 6 WD; Service Threshold: <90.00%; Operating Service Level: 95.00-97.49%.*
- **Initial Response to Queries (%):** The percentage of the total number of CSE 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%.*
- **Training User Satisfaction (%):** The percentage of all training satisfaction surveys completed in each Service Period, rating the Contractor as "Good", "Very Good" or "Excellent". *Operating Service Level: 88.00%-92.99%.*

Metric	Oct 2025		Nov 2025		Dec 2025		Q4 2025	
	Perf	Points	Perf	Points	Perf	Points	Perf	Points
ARCHER2_CSE_Level1 (MTR)	0.1WD	-2	0.1WD	-2	0.1WD	-2	0.1WD	-6
ARCHER2_CSE_Level2 (MTR)	0.4WD	-2	1.3WD	-2	0.7WD	-2	0.6WD	-6
ARCHER2_CSE_Level3 (MTR)	-		27WD	0	-		27WD	0
ARCHER2_CSE_TA (%)	100%	-1	100%	-1	100%	-1	100%	-3
Initial Response to Queries (%)	100%	-1	100%	-1	100%	-1	100%	-3
Query User Satisfaction (%)	100%	-2	100%	-2	100%	-2	100%	-6
Training Satisfaction (%)	100%	-1	100%	-1	100%	-1	100%	-3
Total		-9		-9		-9		-27

51 query feedback responses were received on query resolution in the Reporting Period. 100% of responses had a score of "Good", "Very Good" or "Excellent".

ARCHER2 CSE Queries

This section provides details on ARCHER2 CSE queries during the Reporting Periods from October 2025–December 2025.

CSE Query Statistics

The metrics were specified by EPSRC in Schedule 2.2 of ARCHER2 CSE Service Contract.
- **Assigned:** The number of CSE queries assigned to the Contractor within each query resolution category in the Reporting Period.
- **Resolved:** The number of CSE queries resolved by the Contractor within each query resolution category in the Reporting Period.
- **Backlog:** The number of CSE 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 CSE queries in each query resolution category.
- **First Response:** The average time taken for the Contractor to first respond to the Originator of the CSE query.

Oct 2025					
Service level	Assigned	Resolved	Backlog	Correspondence	First Response
ARCHER2_CSE_Level1	71	71	0	2	0.3h
ARCHER2_CSE_Level2	52	50	16	12	0.4h
ARCHER2_CSE_Level3	2	0	3	0	-
ARCHER2_CSE_TA	5	7	0	11	0.2h
Nov 2025					
Service level	Assigned	Resolved	Backlog	Correspondence	First Response
ARCHER2_CSE_Level1	26	26	0	2	0.3h
ARCHER2_CSE_Level2	44	36	24	12	0.2h
ARCHER2_CSE_Level3	0	2	1	52	0.2h
ARCHER2_CSE_TA	4	4	0	6	0.2h
Dec 2025					
Service level	Assigned	Resolved	Backlog	Correspondence	First Response
ARCHER2_CSE_Level1	8	8	0	3	0.2h
ARCHER2_CSE_Level2	28	42	10	13	0.2h
ARCHER2_CSE_Level3	1	0	2	0	-
ARCHER2_CSE_TA	7	7	0	7	0.2h
Q4 2025					
Service level	Assigned	Resolved	Backlog	Correspondence	First Response
ARCHER2_CSE_Level1	105	105	0	2	0.3h
ARCHER2_CSE_Level2	124	128	10	12	0.3h
ARCHER2_CSE_Level3	3	2	2	52	0.2h
ARCHER2_CSE_TA	16	18	0	8	0.2h

CSE Query Categories

A total of 253 queries were resolved by the ARCHER2 CSE service in the Reporting Period. Resolved CSE queries in the Reporting Period fell into the following categories:

| Service level	Category	Number resolved	% Queries
ARCHER2_CSE_Level1	Courses	105	41.5%
ARCHER2_CSE_Level2	3rd party software	28	11.1%
	Compilers and system software	18	7.1%
	Software errors	18	7.1%
	Batch system and queues	15	5.9%
	Software installation	12	4.7%
	Data transfer	7	2.8%
	Porting, performance and scaling	7	2.8%
	Hardware issue	4	1.6%
	Login, passwords and ssh	4	1.6%
	Storage and compute resources	4	1.6%
	Access to services	3	1.2%
	Courses	3	1.2%
	SAFE: Queries relating to SAFE	2	0.8%
	Other: Queries which do not fit within other categories	1	0.4%
	User behaviour: Queries relating to user behaviour	1	0.4%
	Website and documentation	1	0.4%
ARCHER2_CSE_Level3	3rd party software	2	0.8%
ARCHER2_CSE_TA	Access to HPC	7	2.8%
	Grant	6	2.4%
	Pump-priming	4	1.6%
	Director's Time	1	0.4%
Total		253	100.0%

ARCHER2 Training

As part of ARCHER2, the service has been developing and delivering a training programme for the ARCHER2 community. During the final quarter of 2025, the CSE service has provided a total of 12 days of training, scheduled as follows:

Dates	Course	Location	Days	Attend
14-15 Oct	Introduction to LAMMPS on ARCHER2	Abingdon	2	22
21-22 Oct	Single Node Performance Optimisation	Online	2	9
22 Oct	Green Software Use on HPC	Birmingham	1	13
29-30 Oct, 5-7 Nov	GPU Programming with kernels	Online	2.5	18
19 Nov	Parallel Python	Online	0.5	49
24 Nov	gprMax + MPI	Online	0.5	8
25 Nov	Efficient Parallel IO	Online	1	11
15-16 Dec	Software Carpentry	Oxford	2	9
17 Dec	JAX for scientific computing	Online	0.5	52

Courses were offered both online and in-person at locations including Abingdon, Birmingham, and Oxford. The above table shows a particularly strong engagement in webinars such as "Parallel Python" (49 attendees) and "JAX for Scientific Computing" (52 attendees).

On the feedback for online courses, attendees rate the course on a scale of 15 ("Very Bad", "Bad", "Good", "Very Good", and "Excellent").

The average feedback using this metric was 4.7: i.e., better than "Very Good". Users provided 23 responses, a response rate of 32%. Please note that the feedback from the Software Carpentry course has not been included due to its proximity to the date of this report.

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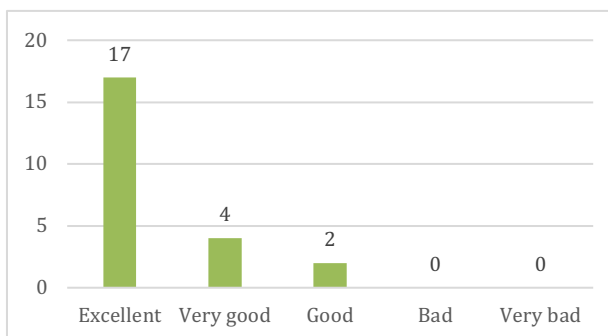
ARCHER2 Embedded CSE Programme (eCSE)

The eCSE team is continuing to collect final reports from completed ARCHER2 eCSE projects and to publish summaries of these on the ARCHER2 website (https://www.archer2.ac.uk/ecse/reports/). Five projects are on-going and all should be finished by August 2026. All 12 GPU eCSE projects are on-going. A number of eCSE projects will be showcased at the ARCHER2 Celebration of Science.

ARCHER2 Community Engagement, Outreach, Collaboration and Impact

Benefits Realisation and Blogs

The latest batch of case studies are about to be published, the majority from pioneer projects.

There were 30 entries to the 2025 image competition. Winners were selected for the best overall image, the best video, and the best entry from an early-career researcher. The images were used to create the ARCHER2 calendar for 2026 and will be used to source potential case studies, webinars, blogs, and posters or speakers at the Celebration of Science.

Seven blogs were published this quarter. Highlights included a blog on ASiMoV-CCS, a new solver for CFD and combustion simulations in complex geometries, and one on the CAKE (Computational Abilities Knowledge Exchange) team at CIUK.

Community and Outreach Activities

The Outreach team had a stand at New Scientist Live 2025, attended by over 20,000 members of the public. We took our logic puzzles, Wee Archie and VR tour, which were all very well received. We also had chance to test a new demo involving micro:bits, to show how the quality of your data for training AI is vital.

EPCC has been accepted as one of 13 exhibitors for the Royal Society Summer Science Exhibition in 2026. This will provide an interactive exhibit based around the value and sustainability of supercomputing.

At Supercomputing 2025, James Richings presented work by Sebastien Lemaire, Nathan Mannell and himself as part of the gprMax eCSE project at the Art of HPC: Meet the Artists Reception (https://sc25.conference-program.com/session/?sess=sess591), engaging with other centres wishing to develop similar visualisation capabilities as part of their own centres.

Sebastien had two other visualisation works exhibited at the same session:
- "Journey Through a Vortex Jungle", Sébastien Lemaire, Paul Bartholomew, Erich Essmann, Justs Zarins, Michèle Weiland, Mark Parsons.
- "Infinite Flow", Sebastien Lemaire, Irufan Ahmed (Imperial College London), Paul Bartholomew.

Lorna Smith presented a talk on the environmental sustainability of High Performance Computing Services at the "Towards Sustainable Digital Research" workshop in Manchester on 5th November. The workshop was organised by the UK Network for Sustainable Research (UKNSR), formerly known as LEAN, the Laboratory Efficiency Action Network. She will present a similar talk at The Francis Crick Institute in January 2026.

Diversity and Inclusivity

During the period, Eleanor Broadway led the organisation and delivery of a session at the SSI Research Software Camp (online, 12th November) entitled "Building Sustainable Outreach: Reuse, Repurpose, Reinvent". Darren White presented at the session, discussing the evolution of our parallel ball sorting activity.

As is usual, the Supercomputing Conference was a highlight on the calendar for the period and, as in previous years, CSE contributed to a comprehensive programme of EDI activities coordinated by

Women in HPC (https://womeninhpc.org/events/sc-2025). Eleanor Broadway was a contributor to the WHPC workshop (17th November) which, this year, focused on "Building Community, Building Careers". She also chaired the early-career, lightning-talks session and lead the organisation and delivery of a birds-of-a-feather session "Building Sustainable HPC Outreach: Reuse, Repurpose, Reinvent". Sypro Nita also presented at this BoF.

In September, WHPC started a series of twice monthly, WHPC Global Committee meetings. These were launched to strengthen the international network, hear directly from the WHPC community and drive new ideas forward. Looking to the future, Women in HPC has signed a new collaboration agreement with the ISC Group, building on the previous agreement which secured WHPC's role in the organisation and implementation of the annual ISC conference. The new agreement enables WHPC's EDI contributions to the conference to be fully embedded in the programme as a first-class consideration.

Closer to home, Eleanor is supporting the Data and Analytics Facility for National Infrastructure (DAFNI) Collaboration (https://www.sc.stfc.ac.uk/programmes/dafni/) as a reviewer for their fellowship programme, with a specific intention to increase applications from underrepresented people.

Eleanor has also led the formation of a joint EDI working group, involving the CAKE (Computational Abilities Knowledge Exchange) Network+ activity and the Computational Science Centre for Research Communities (CoSeC). The working group involves 22 project leaders and advocates and meets monthly.

Quality Management, Information Security and Business Continuity

In addition to the usual round of internal audits and improvement work carried out by EPCC as a part of our ISO 9001 quality, ISO 27001 information security and ISO 22301 business continuity standards, the team has also begun preparatory work on ISO 14001, the environmental management standard. This provides a framework for organisations to manage their environmental responsibilities, reduce impact (like waste, energy use, pollutants), ensure legal compliance, and continuously improve their environmental performance. This is particularly relevant for the ACF data centre where we want to ensure we minimise the potential environmental impact of running the site.