ARCHER2 Quarterly Report

July– September 2025

EPCC

The University of Edinburgh

epcc

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Author(s):	Lorna Smith, Juan Rodriguez Herrera, Chris Johnson, Xu Guo, Anne Whiting, George Beckett, Darren White
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0.2	2025-10-01	ARCHER2 CSE queries performance report, statistics and analysis added	Xu Guo
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ARCHER 2 Quarterly Report

This section of the report covers the period July 2025 – September 2025 for the ARCHER2 service.

ARCHER2 Executive Summary

- As part of the software update collaboration with HPE, the CSE team supported testing of various Operating System images, helping to debug a number of operating-system versions. This resulted in the production of a joint HPE-EPCC recommendation report, recommending a candidate image for consideration by the ARCHER2 Management Board.

- A total of 12 days of training has been delivered this quarter as part of the ARCHER2 CSE training programme. Courses were hosted at University College London, University of York, University of Leeds and Heriot-Watt University, as well as online.

- Initial testing of the PowerSched tool has completed on the ARCHER2 TDS. This tool helps to control power use of Cray supercomputers and, potentially, to improve the energy efficiency of user work.

- EPCC won several prizes at the RSEcon 2025: Andy Turner was awarded the Green RSE award, and Sebastien Lemaire won best poster (one of 5 awards) for his ARCHER2 scientific-visualisation work.

- The eCSE team has continued to support funded eCSE projects, publishing final reports and highlights on the ARCHER2 web site.

- We hosted two interns from the Career Ready mentorship scheme, a UK charity aimed at boosting social mobility. We also welcomed 6 school students for a week-long work experience programme.

- In late June we attended Big Bang Fair 2025, the UK's biggest free STEM fair for young people. Over 20,000 attendees visited the fair over 3 days, enjoying a variety of hands-on activities, workshops, experiments and talks.

- Women in HPC launched the new WHPC Global Committee in September, a collaboration between Chapter and Affiliate leaders to strengthen the WHPC international network; Eleanor Broadway is co-chairing the meetings.

ARCHER2 Forward Look

- The CSE team will continue to test PowerSched on the ARCHER2 main system using a small reservation of nodes. This will provide the energy monitoring required to interrogate PowerSched's performance.

- Spack Version 1.0 has recently been published and represents a change in the way Spack will develop, with much greater stability expected between future incremental updates. As such a service improvement project has been initiated to upgrade the ARCHER2 deployment of Spack to Version 1.0.

- With all eCSE calls completed, the team will continue to support existing projects and ensure final reports are received and highlights published on the ARCHER2 web site.

- A full programme of training is anticipated during this period, with in-person courses held across the UK as well as online courses.

- SC'25 falls within this period, with a full programme of activities planned for WHPC.

- New Scientist Live will be held in London during in October. The team has a booth at this large-scale public engagement event and will showcase the societal value of Supercomputing.

- Planning will continue throughout the next few months for our Celebration of Science event that is being held in March 2026.

ARCHER2 Centralised CSE Team

During this period, a focus for CSE activity has been the Software Update project: a joint HPE-EPCC activity to develop a new, supported Operating System image that can be deployed onto ARCHER2 with little service disruption. More details are provided below in the Service Improvements section.

The RSEcon meeting has become a regular event for the UK DRI community in the late Summer. This year's meeting was held in Warwick, during 8th—10th September and, as always, the ARCHER2 service was well-represented at the meeting. Highlights include:

- Presentation by Evgenij Belikov on 'Monitoring hardware performance counters on ARCHER2 using LIKWID', based on the previously reported, service-improvement activity.
- Sebastien Lemaire showcased his work on scientific visualisation, for various ARCHER2 projects, in a poster titled "Create impactful scientific visualisations from your laptop*! (* also requires access to HPC)".
- Andy Turner contributed two elements to the meeting: a presentation titled "Improving Carbon Literacy in RSEs" at the RSE Leaders and Aspiring Leaders Meeting on 8th September; and a run of the Green HPC Training course in a Birds of a Feather session on 10th September.

ARCHER2 staff also won several prizes at the conference:

- Andy Turner was awarded the inaugural Green RSE award for his contributions Environmental Impact, Creativity, Openness and Community Influence. Andy has developed monitoring tools for infrastructures, designed open-source training material for the community and generally been a voice raising awareness about the issue.
- Sebastien Lemair won the Best Poster award (one of five awards made) for his scientific-visualisation poster.

A full report was published as an EPCC blog articles – https://www.epcc.ed.ac.uk/whats-happening/events/rsecon25 and https://www.epcc.ed.ac.uk/whats-happening/articles/epcc-colleagues-successes-rsecon25.

Andy Turner also wrote a blog post about his work on green computing, focused on "Improving carbon awareness around HPC services" – https://www.epcc.ed.ac.uk/whats-happening/articles/improving-carbon-awareness-around-hpc-services.

Away from RSEcon, the CSE team also represented the service at several other events:

- Juan Rodriguez Herrera attended the XII International Symposium SRUK/CERU (https://symposium.sruk.org.uk/event-2025/) in July as part of his role in the *Spanish Researchers in the UK* network. This is a face-to-face event that is organised annually. Juan presented on "ARCHER2 Uncovered: Insights into the UK's Supercomputing Service", where he introduced ARCHER2 to the audience of UK-based researchers.
- Andy Turner gave a presentation on "Assessing carbon emissions from HPC services" at the CoSeC Energy Efficiency Workshop (16th September 2025, Rutherford Appleton Laboratory).
- Lorna Smith and Andy turner attended the NetDRIVE Annual Meeting, (University of Durham, 24th-26th September 2025).
- Andy also represented ARCHER2 at the UK DRI Programme AAAI Workshop (Edinburgh, 24th Sep 2025).

Continual Service Improvement (CSI) Projects

ARCHER2 Software Update Testing

As noted above, a reasonable portion of CSE's service-improvement time was invested in the project to develop a new Operating System image for ARCHER2. The CSE role focused on testing images developed by HPE and, during the period, CSE tested and help debug a number of operating-system versions, which concluded in a candidate, new image being the focus of a joint HPE-EPCC recommendation paper to the ARCHER2 Management Board.

CSE testing was significantly helped by the previous service-improvement work to develop Reframe. This ensured good test coverage and allowed a rapid turn-around of test results, as the image was refined by the HPE teams in Edinburgh and USA.

PowerSched

During the period, CSE began to test the PowerSched tool that was developed by HPE and HLRS to help control power use of Cray supercomputers and, potentially, to improve the energy efficiency of user work. This work has been carried out in collaboration with the Centre of Excellence team.

An initial round of testing was completed on the ARCHER2 TDS, which confirmed the appropriateness of the installation and provided evidence of the PowerSched mechanics.

Based on this, a second round of testing was agreed, running on a small reservation of nodes on the ARCHER2 main system. This is necessary as the ARCHER2 TDS does not have the energy monitoring required to interrogate PowerSched's performance, plus –as an air-cooled system—is likely to have different energy-use properties.

At the time of writing, main-system testing is underway, and the team plan to relay their initial findings to the PowerSched developers for comment.

Spack Version Upgrade

During the reporting period, CSE were pleased to learn that Spack Version 1.0 was published. This milestone represents a change in the way Spack will develop, with much greater stability expected between future incremental updates.

A service improvement project has been initiated to upgrade the ARCHER2 deployment of Spack to Version 1.0, which will also allow wider adoption by the user community.

On a related note, a decision has been made to use Spack on the new Cirus (Tier 2) system, building on the success of the low-key deployment on ARCHER2, and escalating use. Moving forward, CSE plan to provide a consistent Spack user interface on both ARCHER2 and Cirrus.

ARCHER2 Performance Report

This is the performance report for the ARCHER2 CSE Service for the Reporting Periods from July 2025 – September 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: >1WD, ≤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	July 2025		Aug 2025		Sept 2025		Q3 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	0.2WD	-2	0.2WD	-2	0.3WD	-6
ARCHER2_CSE_Level3 (MTR)	16WD	-0.5	-		-		16WD	-0.5
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		-9.5		-9		-9		-27.5

65 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 July 2025 – Sept 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.

July 2025					
Service level	**Assigned**	**Resolved**	**Backlog**	**Correspondence**	**First Response**
ARCHER2_CSE_Level1	54	53	1	2	0.2h
ARCHER2_CSE_Level2	43	51	17	13	0.2h
ARCHER2_CSE_Level3	0	1	0	25	0.1h
ARCHER2_CSE_TA	14	17	1	9	0.3h
Aug 2025					
Service level	**Assigned**	**Resolved**	**Backlog**	**Correspondence**	**First Response**
ARCHER2_CSE_Level1	50	49	2	2	0.2h
ARCHER2_CSE_Level2	41	35	23	13	0.3h
ARCHER2_CSE_Level3	-	-	-	-	-
ARCHER2_CSE_TA	7	6	3	9	0.9h
Sept 2025					
Service level	**Assigned**	**Resolved**	**Backlog**	**Correspondence**	**First Response**
ARCHER2_CSE_Level1	72	74	0	2	0.2h
ARCHER2_CSE_Level2	25	35	13	11	0.3h
ARCHER2_CSE_Level3	-	-	-	-	-
ARCHER2_CSE_TA	5	4	3	7	0.1h
Q3 2025					
Service level	**Assigned**	**Resolved**	**Backlog**	**Correspondence**	**First Response**
ARCHER2_CSE_Level1	176	176	0	2	0.2h
ARCHER2_CSE_Level2	109	121	13	12	0.3h
ARCHER2_CSE_Level3	0	1	0	25	0.1h
ARCHER2_CSE_TA	26	27	3	9	0.4h

CSE Query Categories

A total of 325 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	176	54.2%
ARCHER2_CSE_Level2	3rd party software	25	7.7%
	Batch system and queues	23	7.1%
	Compilers and system software	11	3.4%
	Software installation	10	3.1%
	Login, passwords and ssh	9	2.8%
	Software errors	8	2.5%
	Access to services	6	1.8%
	Courses	5	1.5%
	Other: Queries which do not fit within other categories	5	1.5%
	Porting, performance and scaling	5	1.5%
	Data transfer	3	0.9%
	Hardware issue	3	0.9%
	Storage and compute resources	3	0.9%
	User behaviour: Queries relating to user behaviour	3	0.9%
	eCSE applications/calls	2	0.6%
ARCHER2_CSE_Level3	Software errors	1	0.3%
ARCHER2_CSE_TA	Access to HPC	16	4.9%
	Pump-priming	6	1.8%
	Grant	4	1.2%
	Director's Time	1	0.3%
Total		325	100.0%

ARCHER2 Training

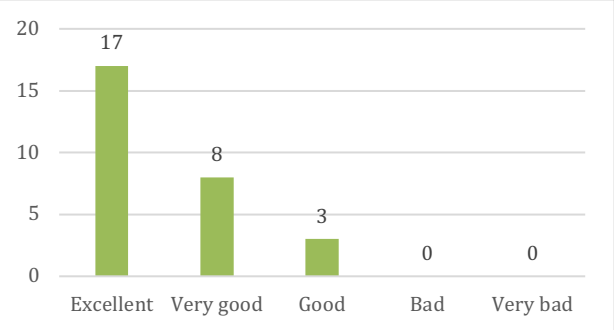
As part of ARCHER2, the service has been developing and delivering a training programme for the ARCHER2 community. During the third quarter of 2025, the CSE service has provided a total of 12 days of training, scheduled as follows:

Dates	Course	Location	Days	Attend
2 Jul	Green software use on HPC	UCL	1	21
2-3 Jul	Modern C++ for Computational Scientists	York	2	13
29-30 Jul	Advanced MPI	Online	2	15
7 Aug	Measuring HW perf. counters on ARCHER2 using LIKWID	Online	0.5	11
12-13 Aug	Introduction to Data Science & Machine Learning	UCL	2	18
18-19 Aug	Message Passing programming with MPI	Leeds	2	12
27 Aug	Message Passing programming with MPI (follow-up)	Online	0.5	12
25-26 Sep	Data Carpentry	HWU	2	15

Courses were hosted at diverse institutions such as University College London, University of York, University of Leeds and Heriot-Watt University, with durations ranging from half a day to two days. Attendance varied across sessions, with the highest turnout of 21 participants for the "Green software use on HPC" course at UCL on 2nd of July.

On the feedback for online courses, attendees rate the course on a scale of 1-5 ("Very Bad", "Bad", "Good", "Very Good", and "Excellent").

The average feedback using this metric was 4.5, i.e., better than "Very Good". Users provided 28 responses, a response rate of 35%. Please note that the feedback from the Data Carpentry course has not been included due to its proximity to the date of this report.



ARCHER2 Community Engagement, Outreach, Collaboration and Impact

Blogs

We published eight blogs this quarter. These included preparations for the power shutdown and a progress report including photographs demonstrating the scale of the work and equipment involved. There was also a blog about the ARCHER2 User Survey responses and the reviews currently taking place of the feedback and suggestions sent in by users. The User Survey report including feedback can be found at https://www.archer2.ac.uk/about/reports/.

We also hosted the ARCHER2 User Advisory Group at the ACF, where they enjoyed a tour of the site and ARCHER2.

Community and Outreach Activities

In late June we attended Big Bang Fair 2025, the UK's biggest free STEM fair for young people. Over 20,000 attendees visited the fair over 3 days, enjoying a variety of hands-on activities, workshops, experiments and talks. Our activities included Wee Archie, parallel sock sorting and a range of logic puzzles. We also had ARCHER2 hardware on display, which prompted some fun conversations with the young people who may have heard of a supercomputer but had no idea what it was or how they were used.

We hosted two interns from the Career Ready mentorship scheme, a UK charity aimed at boosting social mobility via a programme of mentoring, masterclasses, and a paid internship for young people from under-represented backgrounds. The two students worked on AI and machine learning projects.

We also welcomed 6 school students for their week-long work experience, investigating the basics of HPC and AI through group projects. One group investigated parallel scaling of simple codes on ARCHER2, while the other used micro:bit computers to understand the basics of logic and programming by developing a toy model of our parallel sorting game taken to events such as Big Bang Fair.

Diversity and Inclusivity

Several DI activities featured in the reporting period. On 9th September, Women in HPC launched the new WHPC Global Committee, a collaboration between Chapter and Affiliate leaders to strengthen the WHPC international network, enhance community support, and drive new projects. Eleanor Broadway is co-chairing the twice-monthly meetings alongside the WHPC Chair, accommodating multiple time zones.

On 10th September, EPCC hosted a visit from Dr Chia-Lee Yang (NCHC, Taiwan). Discussions focused on EDI efforts happening in Taiwan, and the possibility (via WHPC) to expand to other parts of Asia. Chia-Lee delivered an EPCC seminar whilst visiting.

Furthermore, on 23rd September, Eleanor Broadway represented WHPC at the Latin American HPC Conference CARLA 2025, presenting "WHPC: Shaping the Future of HPC, and How You Can Be Part of It." https://carlaconference.org/women-in-hpc-workshop/.

As always, WHPC are planning for Supercomputing (this year, being held in St Louis, Missouri during 16th—21st November). WHPC will be running a full programme of EDI activities, with support from ARCHER2 staff and from other centres. A mature version of the programme is published on the Women in HPC website - https://womeninhpc.org/events/sc-2025.

Quality Management, Information Security and Business Continuity

Having recovered from the stress and success of our annual external ISO audits, work continues on our annual schedule of internal audits. These are to ensure best practice is being applied and to identify areas of improvement. We also carry out an annual schedule of business continuity tests to help us prevent interruptions to service and to minimise the user impact should these occur. We are currently looking at phishing and ransomware and also exploring what would happen if one of our key suppliers went out of business. Looking at these scenarios helps us tighten up processes, identify areas for training and to put in measures to minimise the risk of the issue happening.

In addition to the three ISO certifications, we have a series of other standards and certifications we need to meet annually. The autumn is Cyber Essentials season, so we are collecting data on the lower level infrastructure data such as versions of operating systems for PCs and servers, to ensure that we are minimising the risk of security vulnerabilities through supported versions and regular patching.