

Quick Reference

Please note that you must read the full Call document for guidance before submitting your proposal

Resource Allocation Panel (RAP): Open access to Tier-2

Call type: Invitation for proposals

Closing date: 31 October 2019 at 16:00

Funding Available: Please find the an indicative amount of resource available based on previous successful applications at each centre listed in Appendix 1.

How to apply: A two-stage application process will be used. Stage 1: applicants must submit a Technical Assessment to the appropriate contact at the centre they wish to apply for access to, along with a short project description. Stage 2: applicants must then submit all full application via the embedded form on the EPSRC Call page.

Assessment Process: Applications to this call are not subject to postal peer review and will be reviewed and prioritised directly by a Resource Allocation Panel (RAP) at the appropriate Tier-2 Centre.

Key Dates:

Activity	Date
Technical Assessment Deadline	17 October 2019
Closing Date for Application Submissions	31 October 2019
Panel Meetings	End November 2019
Project start date	December 2019 / January 2020

Additional information: Applications to this call can request Tier-2 computing resource for a maximum duration of one year. Applicants who wish to apply to the GW4 centre should apply for 3 months access in the first instance unless otherwise justified.

Contacts: A full list of contact details for each Tier-2 Centre is available in Appendix 2. For any other queries please contact Emma Roworth (ARCHERRAP@epsrc.ukri.org).

Resource Allocation Panel (RAP): Open access to Tier-2

Call type: Invitation for proposals

Closing date: 31 October 2019 at 16:00

Related themes: Research infrastructure

Contents of this call document

[Summary](#)

[Background](#)

[Funding Available](#)

[Equality, Diversity and Inclusion](#)

[Equipment](#)

[Eligibility](#)

[How to apply](#)

[Submitting an application](#)

[Guidance on 'Writing an Application'](#)

[User Engagement Strategy](#)

[Assessment process](#)

[Assessment Criteria](#)

[Additional grant conditions](#)

[Moving Forward](#)

[Key Dates](#)

[Contacts](#)

[Change Log](#)

[Appendix 1: Additional Information and Indicative Scale of Previous Successful Applications at Each Tier-2 Centre](#)

[Appendix 2: Contacts at Each Tier-2 Centre](#)

[Appendix 3: Technical Details for Tier-2 Facilities](#)

[Attachment Checklist](#)

Summary

The Tier-2 layer of HPC forms a vital part of an integrated e-infrastructure landscape; it addresses the gulf in capability from a local university system to ARCHER, the UK national Supercomputer.

In 2016, EPSRC recognised that the Tier-2 infrastructure needed to be refreshed and reinvigorated to ensure that it continued to be fit-for-purpose in the rapidly changing e-infrastructure landscape. A total of £20 million was invested in six Centres in 2016. Please find further information on the centres here:

<https://epsrc.ukri.org/research/facilities/hpc/tier2/>

This is a call for applications to access **five** of the six Tier-2 HPC facilities through the Resource Allocation Panel. The five facilities available to access through this call are: Cirrus, GW4, CSD3, HPC Midlands +, and JADE.

Please note that

1. The transition from ARCHER to ARCHER 2 will be taking place during Spring 2020, and as such there will be no Tier 1 service for some of this period. As part of our mitigation procedures some work may be moved to Tier 2 and thus there may be less time available through this Tier 2 Open Access call than in previous calls.
2. Access to the new Tier 2 centres to be funded through the current EPSRC 2019 call 'Tier 2 High Performance Computing Services' is not available as part of this call.

Background

EPSRC is offering open access to **five** Tier-2 HPC facilities through this call for proposals. The five facilities users can access through this call are: Cirrus, GW4, CSD3, HPC Midlands +, and JADE. Further details on each of these centres can be found in appendix 2.

For details on how to access The Materials and Molecular Modelling Hub (MMM Hub) please see their website: <https://mmmhub.ac.uk/2017/06/14/access/>.

Users can request significant amounts of computing resource over a maximum one-year period through this call.

The aim of this call is to:

Provide access to our national Tier-2 HPC facilities for adventurous high-risk, high-reward projects that will benefit from the diversity of computing architectures available at Tier-2.

A non-exclusive list of eligible projects includes:

- Short computational projects that do not warrant a full grant application;
- UK led collaborative projects with international and/or industry partners;
- Joint applications from students (as Co-Is) with proven HPC experience and their PIs;
- Projects that link consecutive standard grant applications or that aid the preparation of a grant or fellowship application;
- Extended feasibility studies and trialing application developments at scale;
- High-risk, high-reward projects that would benefit from using novel architectures.

Applications to the Resource Allocation Panel should lie within the remit of EPSRC although proposals intersecting with the remits of other councils will be considered. Please note that **the Tier-2 centres reserve the right to reject proposals which lie outside the remit of EPSRC**. If you are unsure about eligibility, please contact EPSRC before preparing your application.

For more information about EPSRC's portfolio and strategies, see our website: <http://epsrc.ukri.org/research/ourportfolio/>

Funding available

Applications to this call can request computing resource only for a maximum duration of one year. Technical details about each centre can be found in appendix 3.

Although there is no limit to the number of compute units which can be applied for, **there is a limit to the total amount of resource available** against this call. An indication of the scale of previously successful proposals at each centre is listed in appendix 1 as a guide.

The transition from ARCHER to ARCHER 2 will be taking place during Spring 2020, and as such there will be no Tier 1 service for some of this period. As part of our mitigation procedures some work may be moved to Tier 2 and thus there may be less time available through this Tier 2 Open Access call than in previous calls.

Applicants with large resource requirements are encouraged to get in touch with the named contact in appendix 2 before submission.

Since this type of computer access is not intended to replace full peer reviewed standard grant access, full economic costs for projects cannot be requested; only Tier-2 computing resource is available through this mechanism. Please also note

that Tier-2 centres will expect users to build their own software but will provide support where possible. Any resource allocated is for immediate use and the **start date of the proposal must be within two months of the panel date** (see Call Schedule).

Please note that we do not generally grant extensions to a RAP project and any compute units which have not been used by the end of the project will be lost (exceptions to this policy include situations where the an applicant needs to take parental or sick leave and this significantly impacts their ability to use their allocation, such circumstances should be reported to the helpdesk as soon as is feasible).

Resources for all projects will be divided into quarters and any unused resource in any quarter will be lost. It is therefore imperative that applicants are well-prepared and only request an allocation they can realistically use in the allocated period. This should take into account queuing times, potential issues with newly ported codes, scheduled maintenance periods and the time to respond to intermediate results. Please note that if you are applying to access CSD3, for a project which is longer than three months, resources will be divided pro rata into quarterly allocations unless the application requests and provides justification for a different division of resources. **Please do not hesitate to contact the Tier-2 Centre at an early stage if any computational issues occur.**

Exciting high-risk/high-reward research is strongly encouraged, but careful consideration is needed to ensure that the requested allocation is appropriate and can realistically be used within the project duration.

As a pump priming opportunity for new users Tier-2 centres may offer instant access to give new users the opportunity to test the systems for their purposes and work towards a fully peer reviewed application, either via a standard grant or via this Open Access call:

- CSD3 has a light touch access mechanism for Proof of Concept and Pump Priming applications which are designed to allow users to gather evidence to support large applications for resources. More details about this can be found at <http://www.csd3.cam.ac.uk/> and you are welcome to contact the CSD3 team directly (resources@csd3.cam.ac.uk) to discuss these access mechanisms.
- Cirrus offers Instant Access applications to give new users the opportunity to test Cirrus for their purposes and work towards a fully peer reviewed application, either via a [standard grant](#) or via [Open Access calls](#). See: <http://www.cirrus.ac.uk/access/instant.html> for more details on how to apply.

Please note that if you are from an institution that is a named member of a Tier- 2 Consortium and you wish to use that consortiums machine, you should apply for resources by contacting the centre directly. However, if you wish to access another Tier-2 machine you are eligible to apply for resource through this call.

HEC Consortia members are eligible to apply through this call. UK Car-Parrinello Consortium (UKCP) and Material Chemistry Consortium (MCC) members who wish to use a x86-based resource are expected to contact their consortia directly and

find details of how to access the MMM Hub here:

<https://mmmhub.ac.uk/2017/06/14/access/>.

If you are a member of one of these two consortia and you want access to a non x86-based resource you remain eligible to apply through this call.

Please consider carefully if Tier-2 is the appropriate resource for your proposal. If your project would be better placed at a Tier-1 or Tier-3 resource, please contact the respective Tier-1 centre or local University directly.

Note that ARCHER will be unavailable from the middle of February 2019 until May 2019.

Please note that you can apply to the following centres through this call: Cirrus, GW4, CSD3, JADE and HPC Midlands+. For details on how to access The Materials and Molecular Modelling Hub (MMM Hub) please see their website:

<https://mmmhub.ac.uk/2017/06/14/access/>.

Equality, Diversity and Inclusion

The long term strength of the UK research base depends on harnessing all the available talent. EPSRC expects that equality and diversity is embedded at all levels and in all aspects of research practice and funding policy. We are committed to supporting the research community, offering a range of flexible options which allow applicants to design a package that fits their research goals, career and personal circumstances. This includes career breaks, support for people with caring responsibilities, flexible working and alternative working patterns. With this in mind, we welcome applications from academics who job share, have a part-time contract, or need flexible working arrangements.

Peer review is central to EPSRC funding decisions, we require expert advice and robust decision making processes for all EPSRC funding initiatives. We are committed to ensuring that fairness is fully reflected in all our funding processes by advancing policy which supports equality, diversity and inclusion. Please see our Equality and Diversity webpages

<https://epsrc.ukri.org/funding/equalitydiversity/> for further information.

Guidance on Journal-based metrics

As part of our commitment to support the recommendations and principles set out by the San Francisco Declaration on Research Assessment (DORA; <https://sfdora.org/read/>), UKRI reviewers and panel members are advised not to use journal-based metrics, such as journal impact factors, as a surrogate measure of the quality of individual research articles, to assess an investigator's contributions, or to make funding decisions.

The content of a paper is more important than publication metrics, or the identity of the journal, in which it was published, especially for early-stage researchers. Reviewers and panel members are encouraged to consider the value and impact of all research outputs (including datasets, software, inventions, patents, preprints, other commercial activities, etc.) in addition to research publications. We advise

our peer reviewers and panel members to consider a broad range of impact measures including qualitative indicators of research impact, such as influence on policy and practice.

Equipment

Equipment is not available through this call.

For more information on equipment funding, please see:
<https://epsrc.ukri.org/research/facilities/equipment/>

Eligibility

Only individuals eligible to hold a full EPSRC grant can apply to the Resource Allocation Panel. Our guidance on investigator eligibility can be found at

<https://epsrc.ukri.org/funding/applicationprocess/fundingguide/eligibility/investigators/>.

Any ineligible individuals wishing to access HPC resources through this route must obtain commitment for support by an eligible PI.

For information on the eligibility of organisations and individuals to receive EPSRC funding, see the EPSRC Funding Guide:
<https://epsrc.ukri.org/funding/applicationprocess/fundingguide/>

A list of eligible organisations is provided at: <https://www.ukri.org/funding/how-to-apply/eligibility/>

How to apply

A two-stage application process will be used.

Stage 1- Applicants must submit a Technical Assessment (TA) to the appropriate contact at the centre they wish to apply for access to, along with a short project description. This TA form will be assessed by the contact at the centre and returned to the applicant. A list of contact details for each centre can be found in annex 3.

Stage 2- Applicants must then submit the following documents via the embedded form on the EPSRC Call page:

- Approved Technical Assessment
- Cover Letter (optional)
- Application Form
- A one-page diagrammatic workplan

Stage 1 Obtain a Tier-2 technical assessment

In order for a full proposal to be considered by the panel it **must be accompanied by a technical assessment** completed by the applicant(s) and centre they are applying to. This additional step is important to ensure that the level of resources

requested has been appropriately scoped and that all technical requirements have been considered prior to submission. Applicants will receive comments made by technical reviewers on the Technical Assessment form and will have the opportunity to amend the technical aspects of their forms before the Technical Assessment is approved by the centre. Please note that this is the applicants opportunity of 'right to reply'.

In order to obtain a completed technical assessment, applicants should:

1. Write a short project description and complete Section 1 of the technical assessment form (available for download from the EPSRC call page).
2. Submit the project description and assessment form, with Section 1 completed, to the contact at the centre they wish to apply to listed in appendix 2 prior to **17 October 2019 at 16:00**. It is recommended that applicants encrypt the email request for a Technical Assessment when it is sent to the Tier-2 centre team. **Please make sure the subject header of your submission email states that this is a "Tier-2 submission"**.

At the Technical Assessment stage if your application is deemed to be more technically appropriate for access at another Tier-2 Centre, then your TA form may be passed on to that HPC facility to assess and you will be encouraged to submit an application for access at that centre.

The completed technical assessment will normally be returned to the applicant promptly but this is dependent on the reviewer..

EPSRC and the service cannot be held responsible for applications that miss the final deadline if the applicant has not met the deadline specified above for submission of the technical assessment.

Stage 2 Application form

Applicants should download the application form from the EPSRC call page.

When completing your application form you should take into account the assessment criteria given below (see Assessment criteria) and consider the broad expertise of the panel (see Assessment process). **Applications submitted on an incorrect form will not be considered.** No additional letters of support are allowed.

Submitting an application

Applications should be sent together with the approved technical assessment and a one-page diagrammatic workplan as a single attachment to the to the SmartSurvey available on the EPSRC call page and at <https://www.smartsurvey.co.uk/s/6YYTA/> before the call deadline. Please submit all documents as a single pdf file. **Only one application to this call will be accepted per PI or Co-I.**

Guidance on writing an application

Track Record (max one page): Provide details of the applicant(s) track record in computational science and engineering, porting, developing and using codes, on

HPC facilities. Highlight any previous publications or other scientific outputs arising from HPC work relevant to this application. If you are new to HPC, how do you plan to involve partners to ensure the necessary computing expertise is guaranteed? Please include any other information you think is relevant to demonstrate applicant(s) suitability to undertake this work.

If your project involves collaboration with an international or industrial partner please include any information you feel is relevant regarding their expertise and your collaboration with them.

Other resources associated (max ½ page): State details of any additional financial and/or technical support for this or other research projects relevant to this application. As this proposal is for computing resources only, applicants should give details of how any other necessary resources for the project (e.g. staff time) will be made available.

Objectives (max ½ page): Briefly list the main objectives of the proposed research, written for a generalist scientific audience. Explain how Tier-2 will help you to meet these objectives.

Science Case (max two pages): Describe your proposed research explaining clearly the novelty and timeliness of the work. Explain how it will deliver a high-quality scientific output, or lead to results that will ultimately enable high-quality scientific research.

Please explain why the particular Tier-2 centre is the most appropriate resource for this work, rather than other national, tier-2 or local (university) resources.

Resources Management (max one page): Please state the requested number of compute units, memory, storage; as approved by the technical assessment.

Please state how much storage space you require. It is important that you ensure a timely start and finish of the project as well as efficient use of the granted allocation over the requested time period. No extensions will be granted and any resources which have not been used by the end of the period will be lost. If the work has particularly novel elements that could be considered high risk - high reward, please indicate how the risks will be managed.

Explain how you plan to use and manage the allocated resources and describe the staff resources available to complete the project. Please remember that the total number of compute units allocated through this process is limited. If you are applying for a comparatively large amount of compute resources, you need to demonstrate that your code(s) can make optimal use of this resource – e.g. by providing detailed, relevant, benchmarking and scaling data. (Please note, the Resource Allocation Panel can recommend a reduction in units or time awarded if the original request is not fully justified).

Pathway to Impact (max ½ page): Please identify any potential applications of the proposed work which are not already covered in the case for support section, especially focussing on economic and societal impacts of your project. How might this work impact the national / international high performance computing landscape (for example generating new code, development of existing code, increased computational efficiency, opening up HPC for new scientific areas and industrial sectors). Will any specific training opportunities arise from this project?

Would access to a Tier 2 facility impact new or existing industry-partnerships?
Explain how you will ensure that impacts are achieved.

Further general guidance on impact can be found here:
<https://www.ukri.org/innovation/excellence-with-impact/pathways-to-impact/>

For advice on writing proposals see:

<https://epsrc.ukri.org/funding/howtoapply/preparing/>

Cover Letter (no page limit, optional): Applicants can use the Proposal Cover Letter to express any other information they feel is relevant to their application.

This letter will only be seen by EPSRC and will not be sent to Peer Review, in particular the letter will not be shared with the centre unless this is specifically requested by the applicant. For sensitive information the applicant should state clearly whether the information is confidential. The Proposal Cover Letter should also be used to highlight anything that has been discussed and agreed with EPSRC staff beforehand. For example:

- Applicant is on maternity leave until a certain date;
- Declaration of Interest;
- Additional information about eligibility to apply that would not be appropriately shared in the track record;
- Conflict of Interest for EPSRC to consider in reviewer or panel participant selection
- The application is an invited resubmission.

Assessment

Assessment process

Stage 1- Technical Assessment

Technical Assessment forms will be reviewed by technical reviewers e.g. a Research Software Engineer, at the Tier-2 Centre you have submitted your Technical Assessment form to. The Technical Assessment stage is carried out to ensure that the level of resources requested have been appropriately scoped and that all technical requirements have been considered prior to submission of an application to EPSRC. Applicants can find the criteria the centres will use to assess their technical submission in Section 2 of the Technical Assessment form.

Applicants will receive comments made by technical reviewers on the Technical Assessment form and should respond to these by amending the technical aspects of their forms. Once the technical reviewer at the centre is satisfied that their comments have been addressed the Technical Assessment will be approved, and the form will be returned by email with sections 1 and 2 completed as required for the full proposal stage.

It is recommended that applicants encrypt the email request for a Technical Assessment when it is sent to the appropriate Tier-2 centre.

At the Technical Assessment stage if your application is judged by the triaging committee (including representatives from each Tier 2 centre, the ARCHER Service Provider and EPSRC) to be more appropriate for access at another Tier-2 Centre, then your Technical Assessment will be passed on to that HPC facility for review and you will be notified and encouraged to submit an application to that centre. The aim of this step is to coordinate resource allocation across HPC centres in the UK and allow the transfer of applications which are more appropriate to another Tier-2 system. Therefore proposals which the technical reviewer deems more suited to a different HPC machine may be awarded HPC time on another Tier-2 machine.

Stage 2- Resource Allocation Panel

Applications to this call are not subject to postal peer review and will be reviewed and prioritised directly by a Resource Allocation Panel (RAP).

Once applications have been received by EPSRC they will be directed to the appropriate Tier-2 centre and will be assessed by a RAP. There will be one panel meeting at each Tier-2 centre. At the panel meeting, the RAP will rank the submitted proposals in priority order for allocation. Each centre will then decide on the total number of compute units and time awarded. Applications may be moved between Tier-2 Centres prior to the RAP where this is deemed appropriate by the triaging committee. Any such proposals will be ranked within the priority list for the HPC centre which is deemed most suitable for that proposal and the applicant may be awarded time at a different HPC facility if this is deemed appropriate by the triaging committee, which will take account of advice from the RAP at the respective centres. Please note it is EPSRC's expectation that all decisions of this nature will be made at the Technical Assessment stage and there may not be any proposals that will need to be discussed at this meeting.

Applicants will be notified of the outcome of the panel as soon as possible after the meeting. Brief feedback will be provided to applicants after the panel and the panel can recommend a resubmission if appropriate. **Successful applicants should then email the contact detailed in annex 2 to confirm the start date of their project.**

In the event of this call being substantially oversubscribed as to be unmanageable, EPSRC reserve the right to modify the assessment process.

Assessment criteria

The assessment criteria used by the panel to rank proposals are:

- **Scientific quality (Primary):**
 - Sufficient evidence of the quality, scientific importance, novelty and timeliness of the proposal in terms of the scientific research proposed.
 - The proposal will deliver a high quality scientific output, or lead to results that will ultimately enable high quality scientific research.
 - The proposed work will explore novel and new ideas that may have a high risk, high reward element.
- **Appropriateness and Technical suitability (Secondary Major):**

- The technical suitability of the proposed work for the chosen Tier 2 facility is clearly explained.
- The rationale for why the chosen Tier 2 facility is the best or only UK system on which this research can be conducted and why this work could not be performed on other computing facilities at local Universities or regional centres is clear.
- **Applicant(s) (Secondary):**
 - The team identified within this proposal are appropriate to undertake the research proposed.
 - The applicant(s)' track record in computational science and engineering, porting, developing and using codes, on HPC facilities is sufficient.
 - The applicant(s)' have a strong track record of publishing in this area.
 - Appropriate support mechanisms are in place to guarantee efficient use of the allocated resource.
- **Pathways to Impact (Secondary):**
 - Awareness of the potential broader societal and economic impacts of the proposed work with regard to the application domain and/or the HPC landscape, including potential further applications and how they will be facilitated are demonstrated.
 - Sufficient training or career development opportunities are provided by this project.
 - The potential for future academic and industrial partnerships is clearly described.
 - A clear pathway is shown for how the described impacts will be achieved and captured.
- **Resources and Management (Secondary):**
 - The level of requested resource is justified and appropriate.
 - A clear work plan that justifies the requested allocation is evident.
 - Sufficient staff time has been allocated to complete the proposed work.
 - A clear plan for managing this allocation over the duration of the project is articulated.
 - Risks to the project have been identified and there are suitable risk management strategies in place as well as mitigations for dealing with any issues that arise.

Feedback

As the proposals will not be postal peer-reviewed, brief feedback will be given to each applicant after the Resource Allocation Panel. Furthermore, the panel can recommend invited resubmissions.

Grant additional conditions (GACs)

Grants will be subject to the standard UK Research and Innovation grant conditions however the following additional grant conditions will be added to this call

GAC 1: Publicity and Branding - In addition to RGC 12.4 Publication and Acknowledgement of Support, the Grant Holder must make reference to the Tier 2 centre accommodating the project (including its grant reference, see Appendix 3) and UKRI funding and include the UKRI logo and relevant branding on all online or printed materials (including press releases, posters, exhibition materials and other publications) related to activities funded by this grant.

GAC 2: Extensions - Notwithstanding RGC 6.1, grant allocations of RAP projects may not be extended and any compute units which have not been used by the end of the project will be lost. Exceptions to this are considered to fall under RGC 8.3 and RGC 8.4. Exceptions should be reported to the relevant Tier 2 helpdesk as soon as is feasible.

Moving forward

Submissions to this call will **not** count towards the Repeatedly Unsuccessful Applicants Policy. Further information about the policy can be found at: <https://epsrc.ukri.org/funding/howtoapply/basics/resubpol/rua/>

Applicants will be notified of the outcome of the panel within 5 working days of the meeting.

Key dates

Activity	Date
Technical Assessment Deadline	17 October 2019
Closing Date for Application Submissions	31 October 2019
Panel Meetings	End November 2019
Project start date	December 2019 / January 2020

*EPSRC aims to adhere to the key dates as published, however there may be exceptions where the sift, prioritisation or interview meeting may have to change due to panel member availability.

Contacts

Please contact Emma Roworth with any queries at: ARCHERRAP@epsrc.ukri.org

Change log

Name	Date	Version	Change
Emma Roworth	14/08/19	1	N/A

Appendices

Appendix 1 - Additional Information and Indicative Scale of previous successful applications at each Tier-2 centre

For clarity, any indication of resource requests for previously successful proposals included in this appendix are not limits on the amount of resource which can be requested, they should serve as a guide. Specific requirements for your project should be discussed with the relevant centre, which will be able to advise you on the appropriateness of your requested resource.

1. Cirrus

Successful applications from the previous RAP were in the order of 350,000-2,000,000 CPU hours per proposal, although applications are not limited to within this range.

2. GW4 Isambard Service

The GW4 Isambard service is making 25% of its compute cycles available to ESPRC eligible funded research. Only applications requiring **a maximum of 10s of TeraBytes of storage each** will be considered. This is an evaluation service comprised of multiple advanced architectures housed within the same environment to enable architecture comparison across the latest Intel Xeon Phi, NVIDIA Pascal P100 GPU, and from 2018, Cavium ThunderX2 ARMv8 64-bit processors. Isambard Phase 1 provides access to a Cray CS400 comprising Intel Xeon Phi KNL and NVIDIA Pascal P100 nodes with a Cray Sonexium 3000 storage system. Phase 1 specifications are:

- Four NVIDIA nodes using 2 x Intel Xeon E5-2695 v4 (2.1GHz / 18c Broadwell, 512GB memory) with 2 x NVIDIA Tesla P100 Pascal GPUs.
- Eight Intel Xeon Phi KNL nodes using 1 x Intel KNL 7210 1.3GHz 64c processors, 768GB memory (using 6 *16GB DR4-2400 MHz DIMMS)
- Storage is the Cray Sonexium 3000, providing a total 480TB capacity, presented using Intel IEEL Lustre using EDR InfiniBand.
- Operating System uses RedHat Linux and the Altair PB Professional Job Scheduler.
- Development Software environment includes the Cray Programming Environment and ARM/Allinea's DDT (256 license token).
- Training and 2.0FTE RSE Support Expertise available to assist researchers in installing applications on the service and investigating performance optimisation in collaboration with Cray and ARM64 as part of the ARM64 Centre of Excellence.

- Phase 2 is being installed during summer 2018 and will introduce the ARMv8 64-bit processors in a Cray XC50 form factor. In advance of this, early pre-production ARM silicon is available for limited testing in single node form, but would be subject to NDAs with Cavium and Cray due to the early pre-production release nature of the processor and software.

Please note, due to the evaluatory nature of the GW4 service, project times for this call are not envisioned to be more than three months unless extended times are justified in the proposal.

Please see the GW4 website for further information: <http://gw4.ac.uk/isambard/>

3. CSD3

Successful applications from the previous RAP requested up to 100,000 GPU hours, 100,000 Knights Landing (KNL) hours, or 6,000,000 Skylake core hours per proposal.

It is also preferred that for this call the minimum requested usage for each of these systems is 17,000 GPU hours, 16,000 KNL hours, or 2,000,000 Skylake hours, respectively per project.

Applicants are also able to apply for a combination of resources from different system types. However, final figures for what can be provided will depend on the total level of demand.

For more information visit: www.csd3.cam.ac.uk

4. JADE

Successful applications from the previous RAP were in the order of 5000-25,000 GPU hours per proposal.

5. HPC Midlands +

Up to 15% of the HPC Midlands machine will be available through this call. However, it should be noted that jobs that require more than 600-700 cores may be unsuitable for use on the Midlands + system per proposal.

6. MMM Hub

This centre is not accessible through this call.

Further details on how to access this system and how much resource is available can be found here: <https://mmmhub.ac.uk/2017/06/14/access/>

Appendix 2 - Contacts at each Tier-2 Centre

Cirrus - for all queries please email support@cirrus.ac.uk

MMM Hub - for all queries please email rc-support@ucl.ac.uk

CSD3 - for general queries on access please email the below mailbox (resources@csd3.cam.ac.uk). For Technical Assessment submissions please email: Jeffrey Salmond (rse@csd3.cam.ac.uk)

GW4 "Isambard" Tier-2 Site - for general queries please see the website <http://gw4.ac.uk/isambard> or email GW4@cardiff.ac.uk. For technical Assessment submissions please email gw4@cardiff.ac.uk. For application specific questions, please contact Professor Simon McIntosh Smith (cssnmis@bristol.ac.uk) copying Dr. Christine Kitchen (kitchenca@cardiff.ac.uk) so we can escalate your enquiry accordingly.

HPC Midland+ - for all queries please email research-computing@lboro.ac.uk

JADE - for all queries please email support@arc.ox.ac.uk

Appendix 3 - Technical Details for Tier-2 Facilities

Please find details about each of the Tier-2 facilities below.

Cirrus HPC Service from EPCC (Cirrus)

Grant Reference: EP/P020267/1

System: HPE/SGI ICE XA Cluster

Interconnect: FDR Infiniband Hypercube

Cabinets: 2 HPE/SGI E-Cells. Each E-Cell consists of 2 compute node racks and a cooling rack.

Compute Nodes: 280 dual CPU compute nodes and 2 quad GPU compute nodes

Processor:

Cirrus standard compute nodes each contain two 2.1 GHz, 18-core Intel Xeon E5-2695 (Broadwell) series processors. Each of the cores in these processors support 2 hardware threads (Hyperthreads), which are enabled by default. The standard compute nodes on Cirrus have 256 GB of memory shared between the two processors.

The Cirrus GPU compute nodes each contain two 2.4 GHz, 20-core Intel Xeon Gold 6148 (Skylake) series processors. Each of the cores in these processors support 2 hardware threads (Hyperthreads), which are enabled by default. The nodes also each contain four NVIDIA Tesla V100-PCIE-16GB (Volta) GPU accelerators connected to the host processors and each other via PCIe.

Further details about Cirrus can be found at <http://www.cirrus.ac.uk>

GW4 Tier 2 HPC service (GW4)

Grant Reference: EP/P020224/1

System: Cray XC50 Isambard (Phase 2)

Interconnect: Cray Aries

Storage: Cray Sonexium 3000, providing a total 480TB capacity presented using Intel IEEL Lustre

Compute Nodes: 164 * dual Cavium ThunderX2

Processor: 2 * Cavium ThunderX2 32 core 2.1GHz, 256 GB memory (using 8x16GB DR4-2666 MHz DIMMS per socket)

System: CS400 Isambard (Phase 1)

Interconnect: EDR InfiniBand

Storage: Shared with phase 2, described above

Compute Nodes: 4 * dual NVIDIA P100 and 8 * Intel Phi KNL

Processor: NVIDIA: 2 x Intel Xeon E5-2694 v4 (2.1Ghz /18c Broadwell / 512GB memory) and 2x NVIDIA Tesla P100 Pascal accelerators; KNL: 1 Intel KNL 7210 1.3GHz / 64c processors, 768 GB memory (using 16GB DR4-2400 MHz DIMMS)

Software: Full Cray XC software stack, including CCE compiler, CrayPAT profiler, math libraries, Cray MPI etc. Also Arm suite of software tools: Allinea FORGE, Arm Clang/Flang, Arm math libraries. And finally a full suite of GNU tools: GCC, gfortran et al.

Please see the GW4 website for further information: <http://gw4.ac.uk/isambard/>

Cambridge Service for Data Driven Discovery (CSD3):

Grant Reference: EP/P020259/1

System Name	Specification
Peta4-Skylake	Compute Node Type1 (384) Processor: 2 x Intel Xeon Skylake 6142 processors, 2.6GHz 16-core Memory: 384GB Interconnect: Intel OmniPath Compute Node Type2 (384) Processor: 2 x Intel Xeon Skylake 6142 processors, 2.6GHz 16-core Memory: 192GB Interconnect: Intel OmniPath
Peta4-KNL	Compute Node (342) Processor: KNL 7210 Memory: 96GB Interconnect: Intel OmniPath
Wilkes2-GPU	Compute Node (90) Processor: 1 x Intel Xeon E5-2650 v4 2.2GHz 12-core processor GPU: 4 x Nvidia P100 GPU 16GB Memory: 96GB Interconnect: EDR InfiniBand

Further details about csd3 can be found here: www.csd3.cam.ac.uk

HPC Midlands +

Grant Reference: EP/P020232/1

512 compute nodes in Huawei X6000 quad-node chassis, each with:

- 28 cores, in the form of two Intel Xeon E5-2680v4, and
- 128 GB of memory

giving a total of 14,336 cores and 64 TB of memory.

1 Petabyte of disk storage, delivered via GPFS from four storage nodes.

An EDR Infiniband high-performance internal network. This is structured hierarchically, with islands of 27 nodes (756 cores) connected at full EDR bandwidth, and the islands are then connected to the core of the network at one-third bandwidth.

5 OpenPOWER compute nodes, each with 20 cores and 1 TB of memory.

One of the OpenPOWER nodes also has two Nvidia GP100 GPGPU cards, connected via NVlink.

Please find further details about HPC Midlands + here: <http://www.hpc-midlands-plus.ac.uk/about/system-description/>

The National GPU facility for machine learning, molecular dynamics, and data science research- JADE

Grant Reference: EP/P020275/1

System: 22 NVIDIA DGX-1 Deep Learning Systems

Processor: 8 of NVIDIA's newest Tesla P100 GPUs

Interconnect: NVIDIA's high-speed NVlink interconnect.

Storage: 4 TB of SSD for machine learning datasets. Over 1PB of Seagate ClusterStor storage

Software: optimized versions of major machine learning software packages such as Caffe, TensorFlow, Theano and Torch

Please find further details about JADE here: <https://www.jade.ac.uk/>

Applications on JADE are restricted to run within a single 8-GPU DGX-1 node, using its internal very high bandwidth NVlink interconnect. Also, JADE has NVIDIA-optimised versions of the main Machine Learning packages such as Tensorflow. Therefore, JADE is best suited to Machine Learning applications, and

applications which need no more than 8 GPUs and can benefit from the NVlink interconnect.

The Materials and Molecular Modelling Hub (MMM Hub)

The HPC facility that the MMM Hub hosts is known as Thomas, a 17,000 core machine based around Lenovo 24 core Intel x86-64 nodes.

Please see their website: <https://mmmhub.ac.uk/>

Attachments Check List Stage 1

Deadline: 17 October 2019 at 16:00

Attachment Type	Maximum Page length	Mandatory/ Optional	Extra Guidance
Technical Assessment Form	No page limits	M	Only Section 1 needs to be completed at this stage

Attachments Check List Stage 2

Deadline: 31 October 2019 at 16:00

Attachment Type	Maximum Page length	Mandatory/ Optional	Extra Guidance
Application Form	<p>Total 6.5 pages with:</p> <p>1 page each for: Track record; Resource management; and Work plan.</p> <p>½ page each for: Other resources associated; Objectives; and Pathways to impact.</p> <p>2 pages for the science case.</p>	M	Containing track record, additional support, objectives, case for support, pathways to impact, resource management, list of HPC publications and a work plan.
Proposal Cover Letter	No page limit	Optional	The cover letter can be used to highlight any important information to EPSRC. This attachment type is not seen by reviewers or panel members.
A completed and approved technical assessment from the relevant tier 2 centre.	No page limits	M	Approved by the Technical Advisor

Please ensure you adhere to the above attachment requirements when submitting your proposal. Any missing, over length or unnecessary attachments may result in your proposal being rejected.