DiRAC

Application Guidance for RSE Support

Updated on 22 June 2023

Please follow this guidance to help prepare your application for DiRAC RSE support using the DiRAC RSE Support Application Form.

DiRAC RSE support is available to the DiRAC user community to develop software in a sustainable manner, to run on current and future DiRAC services.

Funding for the DiRAC RSE team was awarded by STFC in order to support:

1. Delivery of a software engineering programme to maximise the scientific exploitation of DiRAC resources by the STFC theory research community.
2. Profiling users' codes and suggesting simple optimization.
3. Speeding up codes using optimized libraries, appropriate compiler-level optimisations and re-writing code to run more efficiently.
4. Benchmarking the DiRAC code set as part of the Software Roadmap programme
5. Porting codes onto new technologies such as accelerators and accelerated I/O storage, etc.
6. Support researchers in the development of new codes/algorithms to increase research output. *This is a support role, it is not envisaged that RSEs carry out the development.*
7. Working on innovation projects with industry partners to develop new tools to improve the performance of DiRAC workflows on current and future systems.

A RAC award of RSE effort to a DiRAC project will enable the employment of a Research Software Engineer (RSE) to work specifically on the relevant software to enable new features or improve the performance of the code. Examples of this could be:

- Implementation of algorithmic improvements within an existing code in a portable manner
- Improving the scalability of software on higher core counts in a portable manner
- Improving a code to enhance sustainability and maintainability
- Improvements to code that allow new science to be carried out on current and future DiRAC services
- The integration of new algorithms/functionality into a code;
- Porting and optimising a code to run efficiently on current and future DiRAC services
- Code development to take a code from a Tier-2 (Regional) or local university cluster to DiRAC level bringing new communities onto DiRAC

It should be remembered that RSE support is technical in nature and is not research support. In particular, RSE effort is not meant to be a replacement for PDRA/Post-grad student activity. The construction of a piece of scientifically valid code is the project's responsibility and is not the role of RSE support. If the initial review process identifies activities which are deemed to be out of scope, the PI will be contacted to discuss the appropriateness of DiRAC RSE effort for the required work prior to the proposal being considered by the RAC.

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Note that the DiRAC RSE Support Application Form is to apply for substantial amounts of DiRAC RSE support effort (3 months or more). If you think your proposed project will take less than 3 months of RSE effort you should contact the DiRAC Service Desk at dirac-support@epcc.ed.ac.uk to discuss your proposal.

A   Submission Process

1. Complete the DiRAC RSE Support Application Form according to the guidance below.
2. Send your completed application form and any supporting documents to dirac-support@epcc.ed.ac.uk by the **deadline of Thursday 14ᵗʰ September 2023, 16:00 UK time** You will receive an acknowledgement of receipt of your application.
3. Your application will be forwarded to the DiRAC RSE group for technical evaluation:
   o   This determines if the work is suitable RSE work and produces a first estimate of required RSE effort.
   o   You may be contacted to provide further information and/or clarification.
4. Your application and the completed technical evaluation will then be forwarded to the DiRAC RAC panel for consideration. You will be notified when this happens.
5. The DiRAC RAC panel will notify you of their decision.

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B Application Form Guidance

All form entries and attachments should be written in one of the following fonts:

- standard Arial 11pt (please note that this is the preferred font)
- Helvetica Regular 11pt or
- an equivalent regular 11pt sans serif universal font e.g. FreeSans

1 Project Details

Basic details for the project.

2 Project Overview (maximum 1 page)

This section should give a general description of the proposed project. A brief summary of the project impact is also to be included to indicate who might benefit from the proposed project, how they will benefit from it and what activities will be undertaken to ensure the potential benefits are achieved. Examples of what to include here are:

- A list of intended impact activities to be done and ways to implement them.
- A plan of deliverables and milestones for the impact activities.
- Any required resource for the impact activities.

You should also state which DiRAC systems you are targeting with this application.

3 Project Objectives and success metrics (maximum 1 page / 4-5 objectives)

Please state the intended objectives of your project, in order of priority. In addition to forming part of the proposal assessment criteria, should your proposal be accepted you will be asked to report against these objectives. These will be used to assess the final success of your project and will also be taken into account when assessing your proposal.

Examples include but are not limited to:

- The enablement of the scientific community to perform novel and previously untenable simulations;
- A quantifiable improvement in performance or scaling of a code;
- The integration of new algorithms/functionality into a code;
- Measurable outcomes leading to wider accessibility in the user community;
- Project outcomes of specific importance to the DiRAC community.
- Preparing codes for future UK DiRAC systems, including improving maintainability and sustainability.

For each objective, applicants should provide an associated set of success metrics, metrics that are specific and measurable and can be used to assess whether the objective has been met at the end of the project.

Applicants are encouraged to list their objectives and success metrics, for example as a table or bulleted list.

4 Technical Information (suggested 2 pages, maximum 3 pages including figures)

This section should provide the technical background for the proposed project and demonstrate a good knowledge and understanding of previous and current work in the related area. The technical information provided may include but is not limited to:

- A brief summary of the previous / current use of the code by the applicants and others, including the HPC platforms used, the software environments for the code running, the number of cores and problem size used, etc.
- The previous / current code performance, scaling and profiling.
- The major algorithms and functional updates related to the code to be used in the proposed project.
- The important prerequisites for the proposed project, e.g. the key algorithms, libraries, software to be installed, etc.
- If there are multiple codes available which have similar functionality to the code you are proposing to work on, please justify your choice of code.

High-resolution images / figures can be added as supporting documents and are not subject to the page restriction.

5 Computational Benefits and Scientific Benefits (maximum 1 page)

Applicants should identify and describe the computational and scientific benefits considering the following aspects:

Why the proposed project is needed and what outcomes/benefits are to be expected.

- Who will be the beneficiaries for this proposed project (the applicants' own research, other research groups, science/computational communities, other disciplines, etc.) and how will the achievement impact the beneficiaries. In cases where only a limited number of immediate users will be impacted by the project outcomes, there should be a clear demonstration of the future applicability of the project's achievements (e.g. developing a code to replace a current one, enhancing future capability, attracting a new user group to DiRAC)
- Plans for sharing the project outcomes and experience within scientific / computational communities should be included in this section. Where there is a clearly identifiable central source for a code, applicants are required to provide assurance that their proposed code modifications will become incorporated. In such cases a letter of support from the code owners outlining the intent to include and publicise any or all proposed code modifications in the main source should be uploaded as a supporting document.
- Any scientific advancements which will be facilitated/enabled by the completion of the proposed project are expected to be included in this section. Supporting letters from UK research groups which give details of the scientific justification are also encouraged to be uploaded as supporting documents.

6 Benefits for the DIRAC Community (suggested 0.5 pages, maximum 1 page)

The section should explain how the outcome(s) of the proposed project will benefit the user community of DIRAC including any anticipated user community on any future DIRAC system. This explanation should include details of the size and nature of the community that will

benefit. Please provide details of how the code will be made accessible to this community, including any licensing restrictions.

As part of the justification for use on any future DiRAC system, we would anticipate a commitment to show the effective use of the code(s) on the existing DiRAC service (e.g. through performance/scaling data on DiRAC).

7 Sustainability (maximum 0.5 page)

Please provide details of how the code and the specific outcomes of this work will be sustained beyond the project. This should include details of the code(s) availability and licensing.

8 DiRAC RSE Support Requested / Work Plan (suggested 1 page, maximum 2 pages)

This section should explain the work plan of the proposed project, including the implementation plan of the technical work within the given time schedule, the specific milestones to be completed and the personnel efforts required from the RSE support (in personal months).

The technical work plan should be described in detail, which may include the code(s) to be used, the approach for implementation, the expected code scaling/performance after the technical work is completed, etc. Any potential risks should be identified and stated clearly together with their likelihood of occurring and any possible solutions.

If there are any individuals / research groups / collaborations suggested by the applicants to contribute to this proposed project, please name them and upload a brief CV of their relevant expertise as a supporting document. Alternatively, please list the necessary knowledge and skills they will provide for the proposed work to be carried out.

9 Preferred start date, duration and FTE level of award

The total effort listed in this table should match that described in Section 8.

Please note that while the RAC will take note of preferences for start dates, for operational reasons it may not always be possible to meet exact scheduling preferences.

10 Has your project previously had DiRAC RSE support?

This section should summarise any previous work done with DiRAC RSE support that relates to the RSE work planned here. If any such work has been carried out, this section should confirm that the outputs of the previous work are being used in production together with a summary of how and where they are being used.

11 Are you are also applying for computational resources at this call?

If your RSE proposal is associated with a proposal for using computational resources, then please explain here any interdependencies. It is not always possible to support every RSE proposal and sometimes RSE work cannot start immediately so it is important for the panel to understand in particular how any use of computational resources may be reliant on RSE work being carried out. Please include an explanation here of how the computational work would be affected if the RSE effort were not to be awarded, or if it were to start later than the preferred start date.

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C Supporting Documents

Please also send any extra supporting documents when submit the RSE application. The supporting documents may include CVs of the proposed technical staff, letters of support stating why the work will be of benefit or how/why the users may make use of the proposed code improvements, bigger version / high-resolution images/ figures, etc. Please note the supporting documents should not be used to include further technical information or additional text for your proposal. The file type of the supporting documents can be any of the following: .doc files, .docx,. docx files, .pdf files, .jpg files and .png files.

D Further Information and Assistance

If you have any queries or require assistance regarding your RSE application, please contact the DiRAC helpdesk dirac-support@epcc.ed.ac.uk.