PRACE 8th Project Access Call for Proposals

Opening date: 3 September 2013

Closing date: 15 October 2013, 12:00 (noon) CEST

Response of applicants to reviews: 3 January – 13 January 2014

Anticipated allocation decisions: 3rd week of February 2014

Allocation start date of awarded proposals: 4 March 2014

Allocation end date of award: 3 March 2015

Type of access: Project Access

PRACE HPC systems available:

- **"Curie", Bull Bullx cluster (GENCI@CEA, France)**
- **"Fermi", IBM Blue Gene/Q (CINECA, Italy)**
- **"Hermit", Cray XE6 (GCS@HLRS, Germany)**
- **"JUQUEEN", IBM Blue Gene/Q (GCS@Jülich, Germany)**
- **"MareNostrum", IBM System X iDataplex (BSC, Spain)**
- **"SuperMUC", IBM System X iDataplex (GCS@LRZ, Germany)**

Introduction

The Partnership for Advanced Computing in Europe (PRACE) is an international non-profit association with its seat in Brussels. The PRACE Research Infrastructure provides a persistent world-class high performance computing service for scientists and researchers from academia and industry in Europe. The computer systems and their operations accessible through PRACE are provided by 4 PRACE members (BSC representing Spain, CINECA representing Italy, GCS representing Germany and GENCI representing France). The Implementation Phase of PRACE receives funding from the EU's Seventh Framework Programme (FP7/2007-2013) under grant agreements RI-261557, RI-283493 and RI-312763.

The mission of PRACE is to enable high impact scientific discovery and engineering research and development across all disciplines to enhance European competitiveness for the benefit of society. PRACE seeks to realize this mission by offering world class computing and data management resources and services through a peer review process.

Scientists and researchers from around the world can apply for access to PRACE resources. Industrial users can apply if they have their head offices or substantial R&D activity in Europe. The PRACE Access Committee, composed of leading European scientists and engineers, ranks the project proposals that will be awarded access to PRACE resources.

Further details on the standard application procedure can be found on the PRACE website ("How to apply" menu).

Scope of the Call

The PRACE 8th Project Access Call for Proposals is intended for large-scale projects of excellent scientific merit and for which a significant European added-value and major impact at international level is anticipated.

Applications for Project Access to PRACE computing resources must use codes that have been previously tested and that demonstrate high scalability and optimisation to multi-core architectures or that demonstrate a requirement for ensemble simulations that need a very large amount of CPU overall. The need for PRACE computing performance must be clearly spelled out in the proposal. Further details on the minimal requirements for using each system are available on the PRACE website ("Call Announcement" – document titled 'Technical Guidelines for Applicants to PRACE 8th Call').

Proposals for code testing and optimisation are outside of the scope of this call. A separate call for Preparatory Access is continuously open (see the "Call Announcement" page on the PRACE website for further details about Preparatory Access calls).

Proposals for Project Access must demonstrate *scientific excellence* and include elements of novelty and transformative aspects. They must have a recognised scientific impact, validated in a coherent dissemination plan. Possible practical and timely applications are therefore desirable. The proposal should demonstrate the potential of achieving results which will be published in high impact scientific peer-reviewed journals.

For this call, proposals requesting resources on a single system or on more than one system are allowed. Please note that a proposal asking for resources on more than one system has to clearly justify the need for those resources. The proposal will be either awarded or rejected as a whole (no part(s) of the proposal can be proposed for awards).

For proposals requesting access as a follow-up to a previous access, it is mandatory to present the final report (or a progress report) of the previous project at the time of the closure of the Call. This report should be sent to the PRACE peer-review team at peer-review@prace-ri.eu by the Call deadline date. The report will be analysed by the scientific reviewers and Access Committee members to evaluate the status of the on-going access and whether the need for the follow-up project is acceptable or not.

The template document for this report is available on the PRACE website ("Information for PRACE Awardees"), or on request to peer-review@prace-ri.eu, and must be carefully respected.

Tier-0 Systems

Curie – Bull Bullx cluster – hosted by GENCI in TGCC/CEA, Bruyères-Le-Châtel, France.
Details and terms of usage can be found here.

Curie is composed of 3 different partitions:

- Curie Fat Nodes (FN): composed by 90 nodes, each node having 16 eight-core Intel Nehalem EX processors 2,26 GHz, 4 GB/core (512 GB/node). These nodes are interconnected through an Infiniband QDR network.

  The peak performance of the fat nodes partition is 105 teraflops.

- Curie Thin Nodes (TN): composed by 5 040 blades, each node having 2 eight-core Intel Sandy Bridge EP processors 2,7 GHz, 4 GB/core (64 GB/node) and around 64 GB of local SSD acting as local /tmp. These nodes are interconnected through an Infiniband QDR network.

  The peak performance of the thin nodes partition is 1,7 petaflops.

- Curie Hybrid Nodes (HN): composed by 144 blades with 8 scalar cores, 2 GPU (nVIDIA M2090, 6 GB of memory per GPU) and one IB QDR link per node, for a peak performance of 200 teraflops.

The total available capacity in this call for CURIE is

- On the fat node partition: **28 million** compute core hours
- On the thin node partition: **201 million** compute core hours
- On the hybrid node partition: **0,5 million** compute GPU hours

Fermi – IBM Blue Gene/Q – hosted by CINECA in Casalecchio di Reno, Italy.
Details and terms of usage can be found here.

The IBM BG/Q system Fermi is composed of 10 240 PowerA2 sockets running at 1,6 GHz, with 16 cores each, for a total of 163 840 compute cores and a system peak performance of 2 petaflops. Each processor comes with 16 GB of RAM (1 GB per core).

The total available capacity in this call is **360 million** compute core hours.

Hermit – Cray XE6 –hosted by GCS in HLRS, Stuttgart, Germany.
Details and terms of usage can be found here.

Hermit has a peak performance of 1 petaflops and is designed for sustained application performance and highly scalable applications. It is composed of 3 552 dual socket nodes equipped with AMD Interlagos processors leading to overall 113 664 processing cores. Nodes are equipped with 32 GB or 64 GB main memory.

The total available capacity in this call is **120 million** compute core hours.

In the second half of 2014, Hermit is planned to be upgraded to a Cray XC30 system named Hornet. In this case, the remaining budget of the project will be transferred to the successor system.

JUQUEEN –IBM Blue Gene/Q –hosted by GCS in Jülich, Germany.
Details and terms of usage can be found here.

JUQUEEN consists of 28 racks and has a peak performance of about 5,8 petaflops. Each rack has 16 384 processing cores with 16 cores forming a node with 16 GB of memory.

The total available capacity in this call is **100 million** compute core hours.

MareNostrum – IBM System X iDataplex - hosted by BSC in Barcelona, Spain.
Details and terms of usage can be found here.

MareNostrum first phase is based Intel Sandy Bridge EP processors 2,6 GHz (eight–core), 2 GB/core (32 GB/node) and around 500 GB of local disk acting as local /tmp. A total of 36 racks, each with 84 compute nodes, each with two Sandy Bridge EP processors. All nodes are interconnected through an Infiniband FDR10 network, with a no-blocking fat tree network topology. MareNostrum has a peak performance of 1,1 petaflops.

The total available capacity in this call is **120 million** compute core hours.

SuperMUC – IBM System X iDataplex – hosted by GCS in LRZ, Garching, Germany.
Details and terms of usage can be found here.

SuperMUC is based on the Intel Xeon-Architecture and will provide a peak performance of 3,2 petaflops. SuperMUC consists of 18 Thin Node Islands with Intel Sandy Bridge processors and one Fat Node Island with Intel Westmere processors. Each Island contains slightly more than 8192 cores. All compute nodes within an individual Island are connected via a fully non-blocking Infiniband network (FDR10 for the Thin Nodes / QDR for the Fat Nodes). A pruned tree connects the Islands.

The total available capacity in this call is **170 million** compute core hours.

Eligibility

Only proposals with a civilian purpose will be eligible to participate in PRACE calls for proposals. Only proposals written in English will be eligible.

- Eligibility criteria for academia and public research organisations

  Researchers from academia and public research organisations are eligible to apply as long as:

  a) The project leader has an employment contract as a researcher in the organisation

  b) The employment contract of the project leader must be valid for at least 3 months after the end of the allocation period

- Eligibility criteria for commercial companies

  Commercial companies may apply on their own or in collaboration with academia/public research organisation (as principal investigators or collaborators). Commercial companies are eligible to apply if:

  a) The company has its head office or substantial R&D activity in Europe

  b) The employment contract of the project leader must be valid for at least 3 months after the end of the allocation period

  c) Access is devoted solely for open R&D research purposes

  d) Commercial companies applying on their own will be limited to a maximum of 5% of the total computing resources of a single PRACE system, subject to the approval of the constraints imposed by state-aid regulations

PRACE HPC centres may have further restrictions on who is eligible to access their own systems. It is the responsibility of the applicant to ensure that they are eligible to access the system(s) they have applied for. In case of doubts, the applicant is advised to contact the HPC centre(s) for clarifications prior to applying (see contacts at www.prace-ri.eu/Resources).

Terms of access

The Principal Investigator (PI) shall direct the project and is expected to be an essential participant in its activities. The PI will have the overall responsibility for the management of the project and interactions with PRACE.

The users must commit to:

a) Provide to PRACE within the period established in the Guide for Applicants a final report, using the proper PRACE template, with the results obtained through the access to the PRACE Research Infrastructure, as well as a qualitative feedback on the use of the resources

b) Acknowledge the role of the HPC Centre and PRACE in all publications which include the results above mentioned. Users shall use the following (or equivalent) wording in such acknowledgement in all such papers and other publications:

*"**We acknowledge PRACE for awarding** us access to [resource-name at site][1]»*

Respecting the words in bold above is very important since PRACE will use this word pattern when searching for bibliographic references in scientific articles

c) Allow PRACE to publish the mentioned report as of one year from the termination of the allocation period

d) Collaborate with PRACE, upon its request, in the preparation of dissemination material

Access for open R&D research purposes will be free of charge but conditional on the fulfilment of the eligibility criteria and terms of access described herein and in the On-line Application Form. If

[1] Use as many instants of the pattern [*resource-name* at *site*] as the number of systems awarded via PRACE. The word 'site' can be replaced by 'BSC, Spain', 'GENCI@CEA, France', 'CINECA, Italy', 'GCS@HLRS, Germany', 'GCS@Jülich, Germany' or 'GCS@LRZ, Germany' as applicable.

this differs from the terms of access that the relevant Centre may have in place, it is the terms of access of the relevant Centre that will prevail.
Users will hold harmless PRACE and the relevant Centre, including their Directors and staff, from and against any claim and expense arising out of the use of the resources.

From the start to the end of the access period, the applicant should direct questions and requests for support to the user support of the HPC Centre(s) where resources have been allocated.

Applicants must inform promptly the peer review team (**peer-review@prace-ri.eu**) and the centre where the resources are allocated of any changes to a successful proposal, namely a decrease in the amount of resources needed or on the distribution of the usage of the resources within the agreed time plan with the centre.

Requests for the extension of the allocation period need to be fully justified, and sent to the HPC centre where the resources are allocated. They will be analysed by PRACE on a case by case basis. Extension will only be considered in the event of unforeseen technical issues at the HPC hosting site which would prevent the user from accessing the awarded HPC resources. The awarded resources (total computer time) cannot be increased.

Process details and deadlines

How to Apply

All proposals must be submitted via the PRACE website at: https://prace-peer-review.cines.fr/

The proposal consists of 2 documents: an on-line form and a "Detailed Project Document", both available via the above mentioned website.

All mandatory fields of the on-line application form must be completed before it can be submitted. After the form has been saved, applicants can continue to access it and update it before they finally submit it. Once an application has been submitted no more changes can be made, unless the applicant un-submits the proposal, performs all necessary changes, saves the changes, and re-submits the proposal. Each time the applicant submits or un-submits the proposal, he/she will receive an e-mail with the status of the proposal (un-submitted or submitted). Please note that only submitted proposals will be put forward for peer-review.

The template of the compulsory "Detailed Project Document" of the proposal (pdf to be attached to the online application form) must be carefully respected (Headings, Length of Paragraphs, Tables and Figures). Proposals that do not follow the template or that are incomplete cannot be considered for peer-review. The PRACE support team is available to answer questions by email while the Call is open (peer-review@prace-ri.eu).

All applications must be submitted by the closing date. The submission website will not accept applications that are submitted after this time. In the case of technical difficulties, the decision of PRACE as to whether an application can be accepted is final.

However, applicants are advised to make sure that they submit proposals as early as possible before the given deadline in order to ensure that all mandatory fields are completed and submission is accepted.

Further details on the standard application procedure can be found on the PRACE website ("How to Apply").

Assessment procedure

The assessment procedure (referred also as peer review process) abides to the PRACE peer-review principles stated on the PRACE website ("Peer-Review").

From 15 October to 18 October, the PRACE Peer-Review Team will perform an eligibility check. Proposals not complying with PRACE eligibility criteria will be rejected at this stage.

From 18 October onwards, the projects will be technically and scientifically peer-reviewed by recognised experts.

Applicants will have the opportunity to comment on these assessments from 3 to 13 January 2014.

The reviewers' reports and the applicants' responses will be analysed by the Prioritisation Panel who will produce the final ranking list. In case of conflicting reviews and responses the Prioritization Panel will analyse the proposal.

Proposals will be awarded by moving down the ranking list in order until resources run out. If necessary, the Prioritisation Panel may agree on a scientific quality cut-off threshold. Proposals ranked under this threshold will not be awarded even if there are resources available on the systems.

All applicants can expect to be notified of the outcome in the third week of February 2014 although efforts will be made to notify successful applicants as soon as possible.

Criteria for assessment

- Technical review

It is essential that proposals submitted are at a high level of scientific and technical maturity and demonstrate the need for Tier-0 resources. Further details on the minimal requirements for using each Tier-0 system are available on the PRACE website ("Call Announcement" page – document titled 'Technical Guidelines for Applicants to PRACE 8th Call (Tier-0)').

The computer codes used during the project should have been previously tested and a high level of scalability and development must be demonstrated. These computer codes must be ready to run on Tier-0 systems.

- Scientific review

Successful proposals must demonstrate scientific excellence and focus on topics of major relevance for European research explaining the novelty, transformative aspects and expected scientific impact, and must include a dissemination plan. The results of the project should lead to committed publication in one or more high-quality journals.

The identification of possible practical and timely applications resulting from the project is desirable and must be made clear in the application.

The scientific review assessment form is available to applicants and can be downloaded from the PRACE website (see documents at bottom of the page with title "Information for reviewers").

Terminology

Core hour: Elapsed time (wall clock time) in which a core is allocated to the user;
GPU hour: Elapsed time in which a graphical processing unit (GPU) is allocated to the user.

Contacts

For any queries related to applications please contact: peer-review@prace-ri.eu