

# Call for Proposals for 5<sup>th</sup> PRACE Project Access and Multi-year Access (Tier-0) and synchronized Call for DECI-9 (Tier-1)



Opening date: 17<sup>th</sup> April 2012

**Closing date: 30<sup>th</sup> May 2012, 12:00 CEST**

Allocation start date: 1<sup>st</sup> November, 2012

Allocation period: 1 year for Project Access and DECI, 1+1 year for Multi-year Access

Type of access: Project Access and Multi-year access (Tier-0) and DECI (Tier-1)

Tier-0 machines available:

IBM Blue Gene/Q "JUQUEEN" (GCS@Jülich, Germany)  
Bull Bullx cluster "CURIE" (GENCI@CEA, France)  
Cray XE6 "HERMIT" (GCS@HLRS, Germany)  
SuperMUC (GCS@LRZ, Germany)  
MareNostrum (BSC, Spain)  
FERMI (CINECA, Italy)

Tier-1 machines available:

IBM Blue Gene/Q and Blue Gene/P, Cray XT and XE, IBM Power 6, range of large clusters including GPU resources made available from Bulgaria, Czech Republic, Finland, France, Germany, Ireland, Italy, The Netherlands, Norway, Poland, Sweden, Serbia, Spain, Switzerland, Turkey and United Kingdom.

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## Introduction

PRACE (Partnership for Advanced Computing in Europe), the European research infrastructure for High Performance Computing (HPC), makes it possible for researchers from across Europe and the world to apply for access to Tier-0 HPC systems via a peer-review process.

The 5<sup>th</sup> PRACE 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.

This Call is also open to applications for Multi-year Projects lasting up to 2 years. The allocation of awarded resources is made 1 year at a time with provisional allocations awarded for the second year.

Please note that this first Multi-year Access Call is to be considered as a test case and its continuation shall be subject to evaluation.

This Call also invites proposals for project access to Tier-1 resources, via DECI, the Distributed European Computing Initiative, providing single project cross-national access to national (Tier-1) HPC-resources. The DECI Call, its processes, the procedures and mechanisms are explained in detail in section “**DECI Call**”.

The deadline for submission of proposals both for Tier-0 and for Tier-1 is **May 30<sup>st</sup>, 2012 at 12:00 CEST**.

Further details on the standard application procedure can be found on the [PRACE website](#) (“How to Apply”).

### **Tier-0 Systems**

o IBM Blue Gene/Q – JUQUEEN – hosted by GCS in Jülich, Germany. Details and terms of usage can be found at <http://www.fz-juelich.de/ias/jsc/juqueen>

JUQUEEN will consist of several racks and will have a peak performance well above its predecessor JUGENE (1 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 312 million compute core hours. The allocation period is November 1<sup>st</sup>, 2012 until October 31<sup>st</sup>, 2013.

o Bull Bullx cluster – CURIE – hosted by GENCI in TGCC/CEA, Bruyères-Le-Châtel, France. Details and terms of usage can be found at <http://www-hpc.cea.fr/en/complexes/tgcc-curie.htm>

CURIE is composed of 3 different partitions:

- Curie Fat Nodes (FN): composed by 360 nodes, each node having 4 eight-core Intel Nehalem EX processors 2,26 GHz, 4 GB/core (128 GB/node). These nodes are interconnected through an Infiniband QDR network.

These 360 nodes are gathered into 90 super fat nodes by using a special hardware interface called BCS (Bull Coherent Switch) which allows to have per node a single system image and 16 eight-core Intel Nehalem EX processors (for a total of 128 cores) and 4 GB/core (for a total of 512 GB of main memory).

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): a partition, only open to PRACE Preparatory Access Calls and 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, with a one year allocation starting from November 1<sup>st</sup> 2012 to October 31<sup>st</sup>, 2013.
- On the thin node partition: 201 million compute core hours, with a one year allocation starting from November 1<sup>st</sup> 2012 to October 31<sup>st</sup>, 2013.

o Cray XE6 – HERMIT – hosted by GCS in HLRS, Stuttgart, Germany. Details and terms of usage can be found at <http://www.hlrs.de/systems/platforms/cray-xe6-hermit/>

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 160 million compute core hours. The allocation period is November 1<sup>st</sup>, 2012 until October 31<sup>st</sup>, 2013.

o SuperMUC – hosted by GCS in LRZ, Garching, Germany. Details and terms of usage can be found at <http://www.lrz.de/services/compute/supermuc/systemdescription/>

SuperMUC is based on the Intel Xeon-Architecture and will provide a peak performance of about 3 PetaFlops. SuperMUC consists of 18 Thin Node Islands and a Fat Node Island which is at first also used as the Migration System SuperMIG. Each Island contains more than 8 000 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).

The total available capacity in this call is 200 million compute core hours. The allocation period is November 1<sup>st</sup>, 2012 until October 31<sup>st</sup>, 2013.

o MareNostrum – hosted by BSC in Barcelona, Spain. Details and terms of usage will be made available at [www.bsc.es/MareNostrum](http://www.bsc.es/MareNostrum)

MareNostrum will be announced shortly and the configuration of the system cannot be disclosed at the time of this call. It will be a system with 1 PetaFlops peak performance, equipped with general-purpose processors.

The total available capacity in this call is 135 million compute core hours. The allocation period is November 1<sup>st</sup>, 2012 until October 31<sup>st</sup>, 2013.

o FERMI– hosted by CINECA in Casalecchio di Reno, Italy. Details and terms of usage are available at [www.cineca.it/en/hardware/FERMI](http://www.cineca.it/en/hardware/FERMI)

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 300 million compute core hours. The allocation period is November 1<sup>st</sup>, 2012 until October 31<sup>st</sup>, 2013.

For this call, proposals asking for resources on a single machine or on multiple machines are allowed. Please note that a proposal asking for resources on multiple machines has to justify the need to access several machines. The proposal will be awarded or rejected in totality (no subpart of the proposal will be awarded).

Under regular circumstances, no extension in time for the period of computer resources allocation will be possible.

## **Scope of the Tier-0 Call and Criteria for Access**

### Regular Projects

Allocations for Regular Projects will be for 1 year starting from November 1<sup>st</sup>, 2012.

Project access is for access to PRACE Tier-0 computing resources for projects which use codes that may have been previously tested and must have demonstrated high scalability and optimisation.

Proposals for code testing and optimisation are not covered by this call. A separate call for Preparatory Access is continuously open. Further details about the Preparatory Access are available in the PRACE website, <http://www.prace-ri.eu/Calls-for-Proposals>.

The 5<sup>th</sup> PRACE 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.

High scalability of the computer code (at least 8k compute cores for JUQUEEN; at least 512 cores for the fat nodes partition and above 2 048 cores for the thin nodes partition for CURIE, 2 048 cores for HERMIT; at least 4 096 cores for SuperMUC, at least 2 048 cores for FERMI, and 2 048 cores for MareNostrum) must be demonstrated.

Proposals for Project Access must have computer codes and data ready to run on the Tier-0 systems. They must demonstrate the need for Tier-0 resources. They must demonstrate scientific excellence and focus on topics of major relevance for European research and include elements of novelty, 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 possibility of achieving results which will be published in high impact scientific peer-reviewed journals.

For proposals requesting access as follow-up to previous access, it is mandatory to present the final report or a progress report at the time of the closure of the Call. This report will be analysed by the Access Committee to evaluate the status of on-going access.

The template document for this report is available on the [PRACE website](#) ("Information for PRACE Awardees"), and it must be carefully respected.

### Multi-Year Access

This PRACE 5<sup>th</sup> Call is open to Multi-year project access inviting applications lasting up to 2 years.

These are subject to the same eligibility and assessment criteria as applications for regular Project Access. In addition, the proposals will have to demonstrate their need for a resource allocation of more than a year.

Allocation of resources is made one year at a time, with provisional allocations awarded for the second year. All Multi-year Access Projects are subject to annual peer review, based on progress report, and the allocation of resources shall be adjusted accordingly.

The total resources allocated to Multi-year Access Projects cannot exceed 20% of the total resources available for this Call.

Please note that this first Multi-year access is to be considered as a test case, and its re-conduction shall be subject to evaluation.

#### Eligibility criteria for Academia

Academia is eligible to apply as long as:

- The project leader is a researcher employed in a research organisation.
- The employment contract of the project leader with the research organisation must be valid at least 3 months after the end of the allocation period.
- The users commit to provide to PRACE, within the stipulated period of time established in the Applicant's Guide of PRACE, a report setting out all the results of the Project according to the information requested by PRACE, as well as a qualitative feedback on the use of the Tier-0 Resources. If such report is not provided to PRACE within the end of the stipulated period, PRACE will impose to the Principal Investigator a sanction consisting of the obligation to compensate the HPC centre providing the service for the full cost of the resources used during the Period of Availability.

PRACE HPC centres may have further restrictions on who is eligible to use the machines (for example due to export rules or security measures). It is the responsibility of the applicant to ensure that they comply with the specific access criteria of each system.

#### Eligibility criteria for Commercial companies

Commercial companies are eligible to apply for Project Access if:

- The employment contract of the project leader with the research organisation must be valid at least 3 months after the end of the allocation period.
- The users commit to provide to PRACE, within the stipulated period of time established in the Applicant's Guide of PRACE, a report setting out all the results of the Project according to the information requested by PRACE, as well as a qualitative feedback on the use of the Tier-0 Resources. If such report is not provided to PRACE within the end of the stipulated period, PRACE will impose to the Principal Investigator a sanction consisting of the obligation to compensate the HPC centre providing the service for the full cost of the resources used during the Period of Availability.
- The following applies specifically to proposals from commercial companies:
  - The company needs to have its head office or has substantial R&D activity in Europe.
  - The access is awarded solely for open R&D research purposes.
  - Commercial companies may apply on their own or in collaboration with academia (as principal investigators or collaborators);
  - 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 boundaries imposed by state-aid regulations;
  - Access for open R&D research purposes will be free of charge. However, prior to being awarded access, companies are required to commit to publish the results obtained in publicly available media.

PRACE HPC centres may have further restrictions on who is eligible to use the machines (for example due to export rules or security measures). It is the responsibility of the applicant to ensure that they comply with the specific access criteria of each system.

## Process details and deadlines for Tier-0 proposals

### How to Apply

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

All mandatory fields must be filled in before the application form 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 changes can be made, unless you un-submit the proposal, perform all necessary changes, save your changes, and submit again the proposal. Each time you submit or un-submit your proposal, you will receive an e-mail with the status of your proposal (un-submitted or submitted). Please note that only submitted proposals will be put forward for peer review.

Please note that the template for the compulsory "Additional Questions" 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 which are incomplete cannot be considered for peer review. The PRACE support team is available to answer questions by email while the Call is open.

**All applications must be submitted by 12:00 CEST on May 30<sup>st</sup>, 2012.** The system 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 filled in and submission is accepted.

Further details on the standard application procedure can be found on the PRACE website <http://www.prace-ri.eu/hpc-access>

### Assessment procedure

**The call will close at 12:00 CEST on the 30<sup>st</sup> of May, 2012.**

From May 31<sup>st</sup> to June 6<sup>th</sup>, the PRACE peer-review team will perform an eligibility check. Proposals not complying with PRACE eligibility criteria will be rejected at this stage.

From June 7<sup>th</sup>, 2012, the projects will be technically and scientifically peer-reviewed by recognised experts. Applicants will have the opportunity to comment on these assessments from 10<sup>th</sup> to 17<sup>th</sup> of September 2012.

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 quality or resources run out. If necessary, the Prioritisation Panel may agree on a quality cut-off threshold. Proposals ranked under the cut-off threshold will not be awarded even if there is resource left on the machine.

All applicants should expect to be notified of the outcome by October 25<sup>th</sup>, 2012 although efforts will be made to notify successful applicants as soon as possible.

The assessment procedure will adhere to the PRACE principles of peer review:

- Transparency
- Ensure fairness to the science proposed
- No parallel assessment
- Managing interests
- Expert assessment
- Confidentiality
- Prioritisation
- Right to reply

More information on the principles of peer review can be found on the PRACE website

<http://www.prace-ri.eu/Application-Guide-and-PRACE-Peer>

#### Criteria for assessment

It is essential that proposals submitted are at high level of scientific and technical maturity and demonstrated the need for Tier-0 resources.

The results of the project should lead to committed publication in one or more high-quality journals.

The successful proposals must demonstrate scientific excellence and focus on topics of major relevance for European research explaining the novelty, transformative aspects, expected scientific impact, and including a dissemination plan.

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

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 the Tier-0 systems.

#### **DECI Call – DECI-9**

DECI provides single project cross-national access to European Tier-1 resources (national systems). Access will be awarded for a period of 12 months, beginning 1<sup>st</sup> November 2012. Resources are available on the following architectures: Cray XT, IBM Blue Gene/Q and Blue Gene/P, IBM Power 6, Intel and PowerPC Clusters (various processor and memory configurations) and hybrid systems (clusters with GPGPU accelerators). Applicants need not specify a particular machine or architecture, but if they do, we will endeavour to take their preferences into account.

#### **Scope of the Tier-1 call and criteria for access**

DECI enables European researchers to obtain access to the most powerful national (Tier-1) computing resources in Europe regardless of their country of origin or work and to enhance the impact of European science and technology at the highest level. Proposals must deal with complex, demanding, innovative simulations that would not be possible without Tier-1 access.

Please note that in addition to offering access to computing resources, applications-enabling and porting assistance from experts at the leading European HPC centres is offered (on request) to enable projects to be run on the most appropriate Tier-1 platforms in PRACE.

### **Eligibility for Tier-1**

Proposals from academia and industry are eligible, as long as the project leader is undertaking non-proprietary research in a European Union country or a PRACE Association member country. Project leaders will typically be employed in research organisations (academic or industrial).

Individual HPC centres may have further restrictions on who is eligible to use the machines, e.g. due to US export rules. Further information is available on request.

### **Tier-1 Computing Resources offered in this call**

We anticipate accepting around 40 proposals for DECI-9.

Cray XT4/5/6 and Cray XE6 – four large Cray XE and XT systems are available at EPCC (UK), SNIC-KTH (Sweden), CSC (Finland), and CSCS (Switzerland). The largest of these machines has a peak performance of 829 TeraFlops and a total of 90 112 cores. Around 38% of the total DECI resource (equating to 40 million XE and XT compute core hours) is available on this class of architecture.

IBM Blue Gene/P and IBM Blue Gene/Q – a BG/P systems is available at NCSA (Bulgaria) and a BG/Q system is available at Daresbury Laboratory (UK). The Blue Gene/P has a peak performance of 24 TeraFlops. The Blue Gene/Q has a peak performance of 1 PetaFlops and a total of 98 304 cores and is particularly suited to projects focusing on the development of highly scalable codes. Around 20% of the total DECI resource (equating to 81 million BG compute core hours) is available on this class of architecture.

IBM Power 6 – an IBM Power 6 system is available at SARA (Netherlands). It has a peak performance of 50 TeraFlops. Around 2% of the total DECI resource (equating to 1 million Power 6 compute core hours) is available on this class of architecture.

Clusters – clusters are available at FZJ (Germany, Bull Nehalem cluster), RZG (Germany, IBM Sandy Bridge cluster), CINES (France, SGI ICE 8200), CINECA (Italy, Westmere cluster plus GPGPU), PSNC (Poland, SGI SMP cluster), ICHEC (Ireland, SGI ICE 8200), IPB (Serbia, AMD plus GPGPU cluster), UYBHM (Turkey, Nehalem cluster), BSC (Spain, Intel plus GPGPU cluster), SIGMA (Norway, Megware high memory cluster, particularly suited to data intensive applications) and VSB (Czech Republic, Intel Sandy Bridge cluster). The largest cluster has a peak performance of 267 TeraFlops and a total of 23 040 cores and the largest hybrid cluster with GPGPUs contains 548 GPUs. Around 40% of the total DECI resource (equating to 20 million cluster compute core hours) is available on this class of architecture.

The indicative amounts of CPU on offer for the call represent the lower boundaries. The total amount of CPU resource available is likely to increase due to ongoing or planned procurements.

### **How to apply to DECI-9**

All DECI proposals should be submitted by email to [deci-support@prace-project.eu](mailto:deci-support@prace-project.eu) using the standard DECI proposal template.



The template for proposals is available at <http://www.prace-ri.eu/documents/DECI-9-proposal-template> and it must be carefully respected. Proposals that do not follow the template or which are incomplete cannot be considered for peer review. The DECI support team is available to answer questions by email while the call is open and applicants are encouraged to contact us if they have any questions. Late applications cannot be accepted. In the case of technical difficulties, the decision of the DECI Peer Review Team as to whether an application can be accepted is final. Applicants are advised to submit as early as possible before the deadline.

The deadline for submission of proposals for Tier-1 systems is **30<sup>st</sup> May, 2012, at 12:00 CEST**.

### **Process details and deadlines for Tier-1 DECI proposals**

The call will close at 12:00 CEST on the 30<sup>st</sup> of May 2012. The DECI Peer Review Team will perform an administrative validation check. In case of administrative inaccuracies, the applicant will receive, on May 31<sup>st</sup> an email asking for administrative details. The deadline for the applicant to provide such details is June 3<sup>rd</sup> at 12:00 CEST. Anything received after June 3<sup>rd</sup> at 12:00 CEST will NOT be accepted nor considered in the review process. Between May 31<sup>st</sup> and June 3<sup>rd</sup> the DECI Peer Review Team will accept modified proposals ONLY when these supply further details in reply to requests from PRACE.

Several submissions of the same proposal before the submission deadline are permitted, but only the last one will be considered.

By 12:00 CEST on June 5<sup>th</sup>, all applicants will receive confirmation that their proposals have been correctly submitted and that they meet the eligibility criteria.

From June 3<sup>rd</sup> the projects will be technically and scientifically peer reviewed. The DECI proposals submitted by Principal Investigator (PI) affiliated to institutions located in one of the Tier-1 contributing countries will be peer-reviewed by their own national peer-review system. The DECI proposals submitted by PI affiliated to institutions located in countries NOT contributing Tier-1 resources will be peer-reviewed by the [HPC-Europa2 SUSP Panel](#). The applicants will be informed of the review results in the third week of October 2012.

### **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.

### **Timetable for both Tier-0 PRACE 5<sup>th</sup> call and Tier- 1 DECI 9<sup>th</sup> Call for Project Access proposals**

- **Opening date: April 17<sup>st</sup>, 2012**
- **Closing date: May 30<sup>st</sup>, 2012, 12:00 CEST**
- **Response of applicants to reviews: September 10-17<sup>st</sup>, 2012 (Only for Tier-0 applicants)**
- **Anticipated allocation decisions: 3<sup>rd</sup> week of October 2012**
- **Allocation start date of awarded proposals: 1<sup>st</sup> November 2012**
- **Allocation end date of award: 31<sup>st</sup> October 2013**

## Contacts

For any queries related to applications please contact:

Tier-0: [peer-review@prace-ri.eu](mailto:peer-review@prace-ri.eu)

Tier-1: [deci-support@prace-ri.eu](mailto:deci-support@prace-ri.eu)

## About PRACE

The Partnership for Advanced Computing in Europe (PRACE) is an international non-profit association with its headquarter in Brussels. The PRACE Research Infrastructure (RI) provides a persistent world-class High Performance Computing (HPC) service for scientists and researchers from academia and industry. The implementation of the PRACE RI receives funding from the EU Seventh Framework Programme (FP7/2007-2013) under grant agreements n°RI-261557 and n°RI-283493.