



**SEVENTH FRAMEWORK PROGRAMME
Research Infrastructures**

**INFRA-2011-2.3.5 – Second Implementation Phase of the European High
Performance Computing (HPC) service PRACE**



PRACE-2IP

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- [3] PRACE-1IP deliverable D4.3.2 “Cross-National Programme for Tier-1 Access Pilots”
- [4] PRACE Digest 2012, http://www.prace-ri.eu/IMG/pdf/prace_digest_2012.pdf
- [5] HPC Europa, <http://www.hpc-europa.org/>
- [6] DEISA communities, <http://www.deisa.eu/science/communities/overview>

List of Acronyms and Abbreviations

AISBL	Association Internationale Sans But Lucratif (International non-profit organisation); PRACE AISBL
BSC	Barcelona Supercomputing Center (Spain)
BSCW	Basic Support for Cooperative Work; a web based system that offers shared workspaces
CINECA	Consorzio Interuniversitario; the largest Italian computing centre
CINES	Centre Informatique National de l'Enseignement Supérieur (The National Computer Centre for Higher Education, represented in PRACE by GENCI, France)
CPU	Central Processing Unit
CSC	Finnish IT Centre for Science (Finland)
CSCS	Centro Svizzero di Calcolo Scientifico (The Swiss National Supercomputing Centre, represented in PRACE by ETHZ, Switzerland)
Cyfronet	A Polish computing centre
DAAC	DECI Access and Allocations Committee
DART	DECI Accounting Report Tool; a Java web-start application to retrieve accounting data from computing facilities
DECI	Distributed European Computing Initiative; a scheme through which European researchers can apply for single-project access to Tier-1 resources through PRACE
DEISA	Distributed European Infrastructure for Supercomputing Applications; EU project by leading national HPC centres; Ended in 2011
DoW	Description of Work (PRACE-2IP)
DPMDB	DECI Project Management Database; a web-based application to view and edit details of DECI proposals and projects
EC	European Commission
EPCC	Edinburg Parallel Computing Centre (represented in PRACE by EPSRC, United Kingdom)
EPSRC	The Engineering and Physical Sciences Research Council (United Kingdom)
ETHZ	Eidgenössische Technische Hochschule Zürich (ETH Zurich, Switzerland)
FZJ	Forschungszentrum Jülich (Jülich Supercomputing Centre, Germany)
GCS	Gauss Centre for Supercomputing (Germany)
GENCI	Grand Equipement National de Calcul Intensif; a French computing centre
GHz	Gigahertz; 10^9 clock cycles per second
GFlop/s	10^9 floating point operations per second (usually in 64-bit, i.e. double precision)
GPGPU	General Purpose GPU
GPU	Graphic Processing Unit
Grid-SAFE	A Java based software framework to support accounting, reporting, usage monitoring, and resource management on computing facilities.
GRNet	Greek Research and Technology Network
HLRS	Hochleistungsrechenzentrum Stuttgart (High Performance Computing Center Stuttgart, represented in PRACE by GCS, Germany)
HPC	High Performance Computing; Computing at a high performance level at any given time; often used synonym with supercomputing
HPC-Europa	An EU-funded programme by which scientists make short research visits to collaborate with a research department working in a similar field

ICE-CSE	International Centre-of-Excellence in Computational Science and Engineering (United Kingdom)
ICHEC	Irish Centre for High-End Computing (represented in PRACE by NUI Galway)
ICM	Interdyscyplinarne Centrum Modelowania Matematycznego i Komputerowego (The Interdisciplinary Centre for Mathematical and Computational Modelling, Poland)
IDRIS	Institut du Développement et des Ressources en Informatique Scientifique (Institute for Development and Resources in Intensive Scientific computing, represented in PRACE by GENCI, France)
KTH	Kungliga Tekniska Högskolan (Royal Institute of Technology, represented in PRACE by SNIC, Sweden)
LINPACK	Software library for Linear Algebra; LINPACK benchmarks are a measure of a HPC system's floating point computing power
LRZ	Leibniz-Rechenzentrum (Leibniz Supercomputing Centre, represented in PRACE by GCS, Germany)
MB	Management Board (PRACE-2IP)
MS	Microsoft; an international software company; or Milestone (PRACE-2IP)
NCF	Netherlands Computing Facilities (the Netherlands)
NCSA	National Centre for Supercomputing Applications (Bulgaria)
NUI	National University of Ireland
PDC	Center for High Performance Computing, at KTH (represented in PRACE by SNIC, Sweden)
PDF	Portable Document Format
PI	Principal Investigator
PMO	Project Management Office (PRACE-2IP)
PPR	Project Proposal and Reporting
PRACE	Partnership for Advanced Computing in Europe; project acronym
PRACE-1IP	First implementation phase of PRACE
PRACE-2IP	Second implementation phase of PRACE
PRACE-3IP	Third implementation phase of PRACE
PRACE-RI	PRACE Research Infrastructure
PSNC	Poznan Supercomputing and Networking Centre (Poland)
RZG	Rechenzentrum Garching (Garching Computing Centre, of the Max Planck Society, represented in PRACE by GCS, Germany)
SARA	Stichting Academisch Rekencentrum Amsterdam; a Dutch computing centre (represented in PRACE by NCF, Netherlands)
SIGMA	The Norwegian Metacenter for Computational Science
SNIC	Swedish National Infrastructure for Computing
SSC	Scientific Steering Committee (PRACE)
std-hour	Standard CPU core hour; Corresponds roughly one hour on an IBM Power4+ 1.7 GHz processor
SUSP	Scientific Users' Selection Panel (HPC-Europa)
TASK	Trojmiasto Academic Computer Network (Poland)
TB	Technical Board
TFlop/s	10^{12} floating point operations per second (usually in 64-bit, i.e. double precision)
Tier-0	HPC systems hosted by the PRACE RI; the largest European systems
Tier-1	National or topical HPC systems
Tier-2	Regional or campus HPC systems

UYBHM	Ulusal Yüksek Başarımli Hesaplama Merkezi (The National Center for High Performance Computing, Turkey)
VSU-TUO	Vysoká škola báňská – Technická univerzita Ostrava (Technical University of Ostrava, Czech Republic)
WCNS	Wroclaw Centre for Networking and Supercomputing (Poland)
WP	Work Package

Executive Summary

This document, the “First Annual Report of WP2”, of the PRACE Second Implementation Project (PRACE-2IP) reports on the work undertaken in the 12 month period from 1 September 2011 to 31 August 2012 towards the objective of establishing and operating a sustainable framework for Tier-1 resource exchange.

Workpackage 2 has two main focuses. The first of these is to continue and to build on the work of DEISA in offering European researchers access to a wide range of national (Tier-1) HPC facilities at the European level through cross-national access programmes, such as DECI. The report details the supporting work undertaken in preparing and managing calls for proposals, assisting applicants in their applications, in arranging their evaluation, in allocation of resources to supported projects and in monitoring project progress. The number of sites providing Tier-1 access has grown steadily. The challenge has been to expand the DECI programme and to maintain the high quality of project support, incorporating new partners promptly and bringing them to full effectiveness as quickly as possible.

The second focus relates largely to sustainability and scalability. In order to build a Tier-1 infrastructure, based on reciprocity of resources provided to PRACE by national HPC operators, two things need to be in place. A transparent model for resource evaluation needs to be agreed and implemented and the administrative processes for evaluating, allocating and managing the resources need to be designed in a way which makes them easy to understand and operate. This will facilitate the addition of new HPC systems and to reduce the overheads and costs of running a Tier-1 resource exchange programme.

This document outlines the progress made in the areas above, discusses issues encountered in year 1 and difficulties foreseen in year 2 and describes proposed measures taken to ameliorate any problems. It also discusses progress in expanding the range of Tier-1 offerings to community and industry support, as is foreseen in the Description of Work.

Evidence of PRACE’s commitment to providing a sustainable Tier-1 HPC infrastructure can be seen in the setting up of a working group to examine the role of a supra-project Optional Programme in defining and directing the scope and governance of Tier-1 activities beyond the threshold of the PRACE implementation phase projects. Although outside the scope of this document, such a move would ensure the continuing existence of a managed and evolving Tier-1 infrastructure and gives increasing weight to the importance of the WP2 activities over the forthcoming year.

1 Introduction

The purpose of the deliverable is to describe the first year of PRACE-2IP project work package WP2 with a special focus on the success of the DECI (Distributed European Computing Initiative) calls.

The main objective of WP2 is to provide Tier-1 resources to European researchers and also to look for models for resource exchange. The work has been divided into three tasks. The first task, T2.1, looks for a framework in resource exchange, described below. Much of the work has been done in task 2.2 by coordinating the new DECI calls, DECI-7 (which was started as a pilot by PRACE-1IP), DECI-8 and DECI-9, and the support related to them. The third task T2.3 concerns the possible community access.

Task 2.1 has to continue the successful practices of the DEISA DECI projects. The projects were based on a *juste retour* exchange of compute resources between the different partners in DEISA without any cash payments involved. The *juste retour* principle means that projects from partner countries obtain Tier-1 resources in proportion to how much their country contributes.

In PRACE-1IP WP4 T4.3 the processes of DEISA DECI and the PRACE pilot project DECI-7 were evaluated and the output of this process is a series of recommendations on how to improve on the DEISA and PRACE pilot practices and how to translate these recommendations to a regular production quality service. T2.1 will follow up on those recommendations that are accepted by PRACE AISBL or PRACE MB. As a consequence, the bulk of work for this task starts after the recommendations of the document of WP4 T4.3 are accepted by PRACE Management.

Meanwhile discussions have started on whether to replace the DECI project with an Optional Programme for Tier-1 access. Such an Optional Programme, as defined by PRACE AISBL Statutes, could enable European Tier-1 access in a sustainable way. These discussions are still in a very premature state, but if this is accepted, it would probably change the workplan for the second year, as described in this document, considerably.

Task 2.2 is the main instrument for DECI coordination, support to researchers responding to the call, collection of proposals and arranging scientific evaluation, allocation of resources to supported DECI projects and assignment of the DECI projects to the Tier-1 HPC platforms available, follow-up on the progress of DECI projects and collection of scientific results and highlights for dissemination.

Task 2.3 was defined to provide a continuation of the DEISA virtual communities on the Tier-1 level in PRACE. The concept of virtual communities is similar to the programme access in PRACE-1IP for Tier-0 resources. The latter was implemented as the Multi-year access call (Tier-0) concurrently with the 5th Project Access Call and DECI-9 call in May 2012. However, there has not been a consensus over such Tier-1 resources within PRACE yet.

This document first describes the work done by WP2 during the first 12 months of PRACE-2IP and secondly, the current plans for the final 12 months. The DECI calls, the proposals and projects are summarized with views over submitted proposals and accepted projects.

2 Work Undertaken in Project Months 1–12

In September 2011, the PRACE-2IP project started and the kick-off meeting was held in Barcelona on September 15–16. The task leaders were nominated. In T2.1: During September 2011 – August 2012 the task leader is Wim Rijks, SARA, co-leader Jura Tarus, CSC, and September 2012 – August 2013 the task leader is Jura Tarus, CSC, co-leader Wim Rijks, SARA. In T2.2 the task leader is Chris Johnson, EPCC, co-leader Isabelle Dupays, IDRIS. In T2.3 the task leader is Michael Browne, ICHEC, co-leader Piotr Arlukowicz, TASK Center, Poland.

Monthly video conferences of WP2 started already in the beginning of September. They are held together with WP7 task 7.2. Sites participating in DECI or WP2 attend it either by video or telephone connection. The minutes of these meetings are stored in PRACE BSCW.

It was agreed that WP2 would take over the coordination of the first PRACE DECI call, DECI-7, from PRACE-1IP WP4 which had prepared and managed the call before the start of PRACE-2IP. The following DECI call, DECI-8, was launched on 2 November, 2011. The next call, DECI-9 was launched on 2 May, 2012. All these DECI calls involved substantial work by WP2 as described in the deliverable D2.1 [2].

The first deliverable of WP2, D2.1 “Migration from DEISA2 to PRACE-2IP” reviews and assesses the longer-term suitability of the DECI processes used and makes recommendations as to how they could be improved so as to better position DECI for its future role in the HPC ecosystem. By completing the deliverable early, it was possible to act quickly upon as recommendations and suggestions for future DECI projects. The deliverable was submitted at the end of December 2011 [2].

WP2 also participated in a Tier-1 integration working group, set up in the Barcelona meeting in September, which had an objective to produce a proposal for alignment and synchronization of access to PRACE resources. The working group was lead by Axel Berg, SARA.

As WP2 had many common interests and aims with PRACE-1IP WP4, a joint face-to-face meeting was arranged with PRACE-1IP WP4 to discuss issues related to both work packages, their collaboration and on plans on further work on 30–31 January in Amsterdam.

The following relevant milestones were achieved during the first project year:

- The first project meeting, PRACE-2IP kick-off meeting, was held on 15–16 September 2011 in Barcelona. The WP2 structure and task leaders were confirmed in September 2011 (MS11).
- Agreements for DECI resources ready (MS21): a commitment of DECI resources was agreed by the partners involved before the launch of each DECI call; a formal description on the responsibilities accompanied with the commitment was presented to the PRACE-2IP technical board in April 2012, see Section 2.1.5.
- The first DECI call, DECI-8, was opened in the beginning of November 2011 (MS22).
- The second DECI call, DECI-9, was opened in April 2012 (MS23).
- The first DECI Magazine, PRACE Digest 2012 [4], was published by PRACE-1IP WP3 in June 2012, was circulated during the PARA 2012 Conference in Helsinki, 10–13 June (MS32).

2.1 Framework for resource exchange

During the PRACE-2IP kick-off meeting in Barcelona on 15–16 September 2011 Wim Rijks (SARA) and Jura Tarus (CSC) were elected to lead task 2.1. During this meeting it was further agreed that Wim Rijks would be task leader in the first year (September 2011 – August 2012) and Jura Tarus would assume the role of co-leader of this task. In the second year (September 2012 – August 2013) these roles would be reversed. In June 2012 it turned out that Jura Tarus would not be able to fulfil this obligation. It was decided that Petri Nikunen from CSC who has ample experience as the task leader of PRACE-1IP WP4 task 4.3 will replace Jura Tarus in the second year of PRACE-2IP as task leader of T2.1.

2.1.1 Identification of subtasks

On 30–31 January 2012 a joint face-to-face meeting between PRACE-1IP WP4 and PRACE-2IP WP2 was organized and took place in Amsterdam.

During the meeting six subtasks for T2.1 were extracted from the DoW and subtask leaders were appointed for these subtasks:

- T2.1.1. Develop an administrative framework for resource exchange between Tier-1 sites to support DECI calls (Ioannis Liabotis – GRNet)
- T2.1.2. Analyze options for a possible exchange between Tier-0 and Tier-1 sites (Lilit Axner – PDC; Wim Rijks – SARA)

- T2.1.3. Refine the pilot practices developed by PRACE-1IP towards production level practices (Chris Johnson – EPCC)
- T2.1.4. Create contracts, processes and exchange policies (Alison Kennedy – EPCC)
- T2.1.5. Study new usage models for Tier-0 and Tier-1 resources, e.g. industrial access, community access and preparatory access (Jura Tarus – CSC, later replaced by Petri Nikunen from CSC)
- T2.1.6. Investigate flexible resource exchange policies for load balancing between sites and over time (Wim Rijks – SARA).

Furthermore it was decided that since most of the work for the subtasks depended on the outcome of WP4 task 4.3 in PRACE-1IP most of the actual work in the subtasks would be concentrated in the second year of PRACE-2IP to avoid doing double work or even work that would be negated by the recommendations of WP4 T4.3. Nevertheless, some work has already been done in the first year.

2.1.2 Develop administrative framework for resource exchange between Tier-1 sites to support DECI calls (T2.1.1)

PRACE-2IP supported 3 DECI calls (DECI-7 pilot, DECI-8 and DECI-9) and it is envisaged that support will continue in PRACE-3IP, so a stable administrative framework is necessary to manage this future support.

In the first year of PRACE-2IP WP2 subtask 2.1.1 performed a more detailed analysis of the current situation regarding the administrative framework of the DECI projects than was necessary for PRACE-1IP WP4 T4.3.

The current situation is that each country declares its high level commitments of existing or future Tier-1 system resources that they will provide to the PRACE Tier-1 resource exchange programme. The data provided by each country includes the providing partner's name, system's name, a brief and high level description of the system's architecture, the performance of the system using the LINPACK benchmark, the fraction of the system to be offered to PRACE for the duration of this DECI as well as the bandwidth of the dedicated connection to the PRACE network.

Before the official announcement of each Call, each DECI partner provides the information described above. This information is collected and organized by the Project Management Office (PMO) in a file (MS Excel).

This information is used by the DECI Team that converts those commitments to Standard core hours. Details on how to obtain these Standard core hours are provided in Deliverable 4.3.2 from PRACE-1IP [3].

After closing a particular call and finalizing the results of the accepted DECI projects and thus the upcoming application support requests, the system assignment and resource allocation takes place. This process is also described in the Deliverable 4.3.2 from PRACE-1IP. A new Excel file with these data is produced.

Data regarding the DECI projects (assigned machines, number of assigned core hours etc.) is inserted in the DECI Project Management Database (DPMDB) that provides several useful data views. These views are organized by project, exec site or home site.

Accounting data about used resources is inserted in DPMDB on a monthly basis. In order to gather accounting information, two systems can be used: DART (<http://www.prace-ri.eu/Accounting-Report-Tool>), or Grid-SAFE (<http://www.epcc.ed.ac.uk/projects/grid-safe>).

In principle the DPMDB has all the information needed in order to evaluate the resources offered from sites or countries to the DECI call. In future, special views might need to be created for showing the information for different periods of time (i.e. 1, 2 and 3 years) and not only on a per DECI call basis. Site resource commitments are stored in the project's document store (BSCW), from where they are copied manually in DPMDB.

Through the above tools and mechanisms, DECI project management can evaluate resource commitments and actual usage of resources per partner or group of partners.

2.1.3 *Analyze options for a possible exchange between Tier-0 and Tier-1 sites (T2.1.2)*

The PRACE calls for access to Tier-1 (DECI) and access to Tier-0 systems open simultaneously twice a year. The closing date is also the same, thus from the point of view of applicants it can be viewed as one PRACE call to two different classes of resources. This can be considered as a first step towards exchange between Tier-0 and Tier-1 sites that is already implemented to date. However, currently the synchronization of the two processes ends at this point. The further procedures towards acceptance or rejection of the submitted proposals differ as described below.

In the first year of PRACE-2IP the Tier-0 and Tier-1 processes were analysed and compared by T2.1.2 and a number of possibilities to harmonize the two processes further were identified.

Submission of proposals

Especially regarding the procedures for the DECI process, PRACE staff felt that there were a number of shortcomings in the procedure. Therefore a taskforce on DECI tools was formed by WP4 of PRACE-1IP and the work is continued within WP2 of PRACE-2IP to analyze these procedures and to give recommendations to improve them (see PRACE-1IP Deliverable 4.3.2 [3]).

One of the recommendations of this taskforce is to replace the current procedures (involving a lot of manually filling in paper forms) by a web-portal similar to the one used by the Tier-0 calls, which would lead automatically to an opportunity to come to a possible exchange between the Tier-0 and Tier-1 calls:

This subtask has the opinion that this web-portal, whether it is shared or separate, should be flexible enough to

- share a common database or allow easy information interchange,
- show a similar interface to applicants for Tier-0 and Tier-1 access, and
- give flexibility to both DECI and Tier-0 staff to introduce needed or desired modifications easily.

NOTE: if the Tier-0 and DECI web-portals are not to be the same tool then they should have at least a common database or a common sharing point of information to keep open the option of moving a project from one to the other without having to copy all information again, e.g. if a user has accidentally applied for the wrong call.

Assessment process

The PRACE peer review for both Tier-0 and Tier-1 proposals consists of two phases of assessment: technical and scientific. The two assessments are carried out separately by different groups of experts.

The technical review precedes the scientific review and seeks to assure that the proposal is technically feasible for the intended platform.

For Tier-0 the technical review is carried out by the experts at the six Tier-0 sites. The applications are distributed among these experts according to which system the applicant specified as the requested execution site. During the technical assessment an increase or decrease in the requested resources can be put forward for consideration by the prioritisation panel. The technical assessment may result in one of three outcomes: 1) strongly recommended, 2) recommended, 3) proposed for rejection. The outcome is then passed on to the prioritisation panel.

At the Tier-1 level, the technical review of DECI proposals is done during the two week period prior to scientific review, after the closing date of the corresponding call. However the technical evaluation of DECI proposals is carried out by the experts at the centre where the main applicant's institution is geographically situated. This centre is called a "home site". The experts conducting technical evaluations have the freedom to advise that the application is suitable for different execution sites from the one requested by the applicant.

The Tier-0 approach to carrying out the technical review by experts of the execution site is difficult to implement in DECI as the number of systems in DECI is large (more than 15) and very diverse. Moreover in many cases the applicant's request for a specific execution site turns out to be not the most optimal one, either because of technical reasons or because of resource availability at the proposed site. The only disadvantage of the DECI "home site" approach is the large spread in the number of proposals per home site. However this hasn't been a major problem so far.

Other than this, there are no major differences between Tier-0 and Tier-1 technical review procedures. The information collected from the technical review is similar both for Tier-0 and Tier-1.

For the possible exchange of proposals between Tier-0 and Tier-1 systems the procedure of carrying out the technical review is not an essential factor. The important part is the outcome of this review. This outcome for both Tier-0 and Tier-1 systems can be saved in a common database of web-portal(s) in a homogeneous and similar manner to allow a possible comparison between the two. Thus it seems to be no obstacle to carry out the technical reviews in a different manner for Tier-0 and DECI. However we need to stress that the assumption is that DECI will also need a web-portal based technical review tool instead of the current MS Word document based one.

The scientific review of Tier-0 proposals is performed by internationally recognised experts in the field of science of the proposal. One of the reviewers, but no more than one, may be chosen from the list of reviewers suggested by the applicant. The PRACE staff managing the peer review process will seek to assure that each proposal is evaluated by reviewers that are experts in at least one aspect of the proposal but don't have any conflicting interests (being direct competitors in the same field of research) and together can provide an expert view on the entire scientific problem presented. The reviewer's appointment requires explicitly that the details of the applicants and the details of their proposals must be kept confidential. By signing the Appointment letter, each reviewer confirms that he/she has no conflict of interest and that she/he commits to the terms of the "Declaration of confidentiality".

In Tier-1 the home sites are responsible for appointing a peer review committee that performs the scientific evaluation of all the proposals assigned to them. This scientific panel can be either a National Committee or sites can delegate the process to the Scientific Users' Selection Panel of HPC-Europa (SUSP). The evaluation of the external (non-partner) proposals is done by default by SUSP. The applicants' identities are not kept confidential from these committees. Each national scientific panel ranks the reviewed proposals in the same way as the Access Committee of Tier-0 ranks proposals after peer review (see below). However this ranking is a local ranking between national applicants rather than a global one as it is in Tier-0 procedures. Finally the projects are accepted based on these local rankings, recommendations of national scientific panels and availability of resources according to the *juste retour* principle.

To conclude, the exchange of projects between Tier-0 and Tier-1 would only be possible in the period between the technical review and the scientific reviews. During the technical review it becomes clear whether the Tier-1 project has the capability to scale to the Tier-0 level or it is too "small" for the Tier-0 level. Doing the exchange at this stage saves the time of scientific reviewers and also helps us to avoid the inconsistencies between global and local scientific review rankings. Because the Tier-0 and Tier-1 scientific reviews are setup rather differently it is inconvenient to switch from Tier-0 to Tier-1 or vice versa, after the scientific review.

Moving proposals between Tier-0 and Tier-1 has the disadvantage that the scientific review process is different and that the level of competition can be different, possibly decreasing the chance of acceptance of the proposal. On the other hand, if the technical evaluation indicates that the proposal is not well suited for the Tier level to which it was submitted the chance of acceptance is not very high anyway.

Nevertheless, if the possibility of moving proposals is accepted by PRACE for transparency's sake it would be advisable not to do it without discussing this with the applicants.

A suggestion is to introduce an intermediate step in the two weeks after the technical review to reach a final decision on those projects that are potential candidates for transferral to the other call to inform the applicant and to allow the applicant to supply the necessary information to participate in the other call. During the first of these two weeks the Tier-1 and Tier-0 technical review experts can consult with each other on the candidates for exchange and to decide the type of architectures these projects are suitable for. After the final decision the PIs of the projects can use the second week to complete scientific and technical information for either Tier-1 or Tier-0 scientific review.

Resource Allocation

For Tier-0 after technical and scientific assessments, proposals are forwarded to the PRACE Access Committee that makes a recommendation for resource allocation to the PRACE Board of Directors. The Access Committee seeks to allocate available resources to qualified proposals so as to best meet the PRACE objectives.

The Access Committee is composed of eminent scientists from the PRACE scientific community. The members are primarily selected from PRACE partner countries, but scientists from other countries may also be chosen if deemed necessary or desirable. The composition of the Access Committee is available on the PRACE website.

The Access Committee analyse the technical and scientific review reports together with any applicants' response in producing a single ranked list for each call for proposals.

The Committee takes into account the advice of the technical and scientific assessments regarding amounts of resources requested or desirable for each proposal in making its

recommendation to the Board of Directors on the resources to be allocated to each proposal. The Access Committee prepares the ranked list in a face-to-face meeting organized in two phases. In the first phase, subpanels for different areas of science are created for every call and rank the applications within their respective areas. The subpanels are chaired by one or two experts from the Access Committee, and 5 or 6 experts are invited to do the prioritisation. In the second phase, the subpanels' lists are merged into a single list, at a meeting with all the members of the Access Committee, where the experts of the subpanels of the different areas are also invited.

As applicants for Tier-0 access must request a specific system, the allocation procedure is trivial, once a proposal is accepted.

The acceptance procedure for Tier-1 access is different. Once the National scientific panels and the HPC-Europa SUSP have evaluated their sublist of proposals the sublists are collected by the DAAC (DECI Access and Allocations Committee), which also decides which national proposals to accept, based on the *juste retour* principle. The ranking of the external projects is performed by the HPC-Europa SUSP and the acceptance of the projects is discussed by all DECI staff members in a videoconference. The number of accepted external projects depends on the amount of resources that is available. Resources are provided by all DECI partners.

The process to assign execution sites for DECI projects is complicated. The DECI management team reviews the accepted proposals and checks how well each machine matches the requested resources. The best suitable machine gets a preference ranking of 1, the second best suitable a ranking of 2, and so on. Unsuitable machines get no ranking. As a result, a machine preference table is obtained. By considering the machine preference table and resources available on machines, projects are assigned to execution sites.

There is such a large discrepancy between the machine assignment procedures for Tier-0 access and DECI access that it is hard to envision that this phase of the process will ever be integrated. However, this doesn't have to be a problem for the main objective of the integration, namely ease of use and flexibility for the applicants in the application process.

2.1.4 *Refine the pilot practices developed by PRACE-1IP towards production level practices (T2.1.3)*

The resource exchange practice as it is currently used in the PRACE DECI calls (DECI-7, DECI-8 and DECI-9) is constantly reviewed and adapted to take into account new insights. This subtask will continue to do this. Major changes in the *juste retour* principle fall outside the scope of this subtask.

The first DECI call, DECI-7, to take place under PRACE was instigated as a "pilot" call intended to smooth the transition between the running of DECI under DEISA to running the programme under PRACE as well as to define and test new practices relevant to PRACE. Conceptually DECI within PRACE remained largely unchanged from the equivalent programme under DEISA. From a practical point of view the pilot call included several new partners as well as some new staff from within sites which had previously participated under DEISA. Going from DEISA to PRACE, the overall number of sites actively participating increased from 11 to 14 and the number of HPC machines involved increased from 15 to 19. Infrastructure required on the new machines was dealt with by WP6; here we consider practises relevant to the DECI process – i.e. the submission and evaluation of proposals and the overseeing of the running of the DECI projects, although some of this, namely project enabling work and technical evaluations, was dealt within task 7.2 of WP7.

The submission of proposals for the pilot call remained exactly as it was under DEISA with submissions being accepted and acknowledged by email and proposals being entered into the

BSCW document management system separated according to home site. Where it was not obvious which site should act as home site, for example in the case of external projects (those received from countries without a PRACE Tier-1 site), this was agreed by email and video conference. It has been widely acknowledged since the end of DEISA that this method of submission is inadequate for a modern resource exchange programme such as DECI as it does not allow for any proper revision control or standardisation of proposal formats and leads to much copying-and-pasting of information which is error prone and wastes time. With assistance from WP10 and subtask 2.1.1, we are actively investigating ways of implementing an on-line submission tool with the hope that this may be partially implemented before the planned DECI-10 call, or very soon afterwards. The submission system used in the pilot call will continue to be used until such a tool is implemented and tested. During the submission process of the pilot call, the scientific evaluations were coordinated within WP2 (T2.2) but the technical evaluations were performed by WP7 (T7.2) with the latter task taking ownership of the technical evaluation form itself. This appeared to work well and has been continued into later calls although we will re-visit this partitioning of work for later calls.

Proposals and running projects are managed with a database known as the DPMDDB originally designed, hosted and maintained at RZG within DEISA. This database was moved to SARA for the pilot call and has been used successfully since then. Some changes were made to the way in which data was input so that this could be done more autonomously by individual sites rather than having to all be done centrally. This appeared to work reasonably well for the pilot call and has continued for subsequent calls although it does rely on all sites entering data on time which can be a source of delay. We are actively looking at ways to improve the entering of data into the DPMDDB and also ways of making the DPMDDB itself more flexible for updating fields. This work will be considered alongside the work on the new submission tool and the administrative framework for resource exchange (see Section 5.1).

The pilot DECI (Tier-1) call was synchronised with the Tier-0 call giving us a fixed period of time to perform all technical evaluations, scientific evaluations, make decisions about acceptance or rejection, assign machines to successful projects and finally let PIs know the success of their proposals in time for starting the projects. We have continued to synchronise Tier-1 and Tier-0 calls in this manner as this appears to work well when advertising the call deadlines. We found that for the pilot call PIs were informed of the success of their projects too close to the starting date. For this reason for subsequent calls we contacted all PIs as soon as a decision had been made about the acceptance of their project and then the home site representative contacted them later once machines had been assigned. This appeared to work well as DECI-8 projects generally got underway more smoothly than for DECI-7.

Internal proposals (i.e. PIs from countries contributing to DECI) are generally evaluated by scientific panels from within the country from which the proposals were submitted whereas external proposals are scientifically evaluated by the scientific panel of HPC-Europa (SUSP). For the pilot call PSNC found they had just one proposal and so requested that this proposal was included in the SUSP evaluation to allow it to be considered in the context of other proposals. For subsequent DECI calls this practice has continued and two of the new sites joining for DECI-9 have also requested that their proposals are evaluated by SUSP.

Each successful DECI project is granted access to resources for 1 year with a new call every 6 months. This means that at any one time there are two overlapping sets of projects running and for most of the year this also overlaps with either an open call or the evaluation of a recently-closed call. Although there are obviously busy periods around the close of a call or close to the start of new projects, this generally appears to spread the load reasonably well across the year. We will however constantly review the frequency and timing of calls.

New sites and machines have been added at each DECI so far within PRACE while some sites temporarily drop out for one call. This is likely to continue for the foreseeable future and so practices will be monitored constantly to enable new sites to join easily.

Day-to-day management of the DECI pilot call was done mainly through email with monthly video-conferences taking place throughout the whole year. This practice appears to work well and we intend to continue this for the remaining calls.

2.1.5 *Create contracts, processes and exchange policies (T2.1.4)*

A subtask that does not depend on the outcome of PRACE-1IP WP4 T4.3 is subtask 2.1.4, where the main outcome is the development of a “resource exchange agreement”. In the DoW this was planned to be ready in month 4 of PRACE-2IP as described in milestone MS21 “Agreements for DECI resources ready”. According to the DoW it should have been incorporated in deliverable D2.1 [2].

Due to the decision to plan and open the DECI-7 call before the official start of the PRACE 2IP project (as a pilot call) the commitment of DECI-7 resources by partners was effected just after the start of PRACE-2IP and researchers were given access to PRACE Tier-1 resources from November 2011, at the start of project month 3 of the project. The achievement of the milestone was therefore postponed from project month 4 to project month 8.

A first draft of the “Resource Provider Agreement” was produced in project month 6 (March 2012), and after internal review and adaptations was passed on to PMO. . Because no final approval of this document was received before the DECI-8 call was closed, we decided to postpone introduction of the “Resource Provider Agreements” until the commitments of partners for DECI-9 are decided.

2.1.6 *Study new usage models for Tier-0 and Tier-1 resources (T2.1.5)*

This subtask deals with new usage models for Tier-0 and Tier-1 resources, e.g. industrial access, community access, and preparatory access. These new types of access were investigated in detail also by PRACE-1IP task 4.3, so we decided to await the outcome of this investigation before starting our work. One of the conclusions is that it is worthwhile to start up pilot projects for these types of access. For more details we refer to the section on the planned work in the second year (Section 5.1.5).

2.1.7 *Investigate flexible resource exchange policies for load balancing between sites and over time (T2.1.6)*

This topic was also investigated in detail by PRACE-1IP T4.3, so the efforts in this subtask were postponed to the second year. One bottleneck that was identified in the work of PRACE-1IP T4.3 was that of expressing all resources in standard core hours and defining conversion factors for this. A second issue that came forward is that of matching commitments and project claims per partner per call and finding more flexible procedures for this. These will be the main topics that will be tackled in the second year. For more details we refer to the section on the planned work in the second year (Section 5.1.6)

2.2 DECI

This reporting period overlaps with three separate DECI calls, see Figure 1. The schedule for DECI-10 is only provisional and decisions on it have been postponed until basic elements of a Tier-1 programme have been defined and agreed by the PRACE AISBL.

Statistics for these DECI calls are given in Sections 6, 7 and 8. Some of the work performed during DECI projects under both DEISA and PRACE was presented on 12 June during a Mini Symposium as part of the PARA 2012 “Workshop on the State-of-the-art in Scientific and Parallel Computing” which took place in Helsinki, Finland. Five talks were given by PIs (or other DECI project members) and as this was a great success we intend to repeat this exercise in future years.

In the following sections we give an overview of the work which was undertaken for each call.

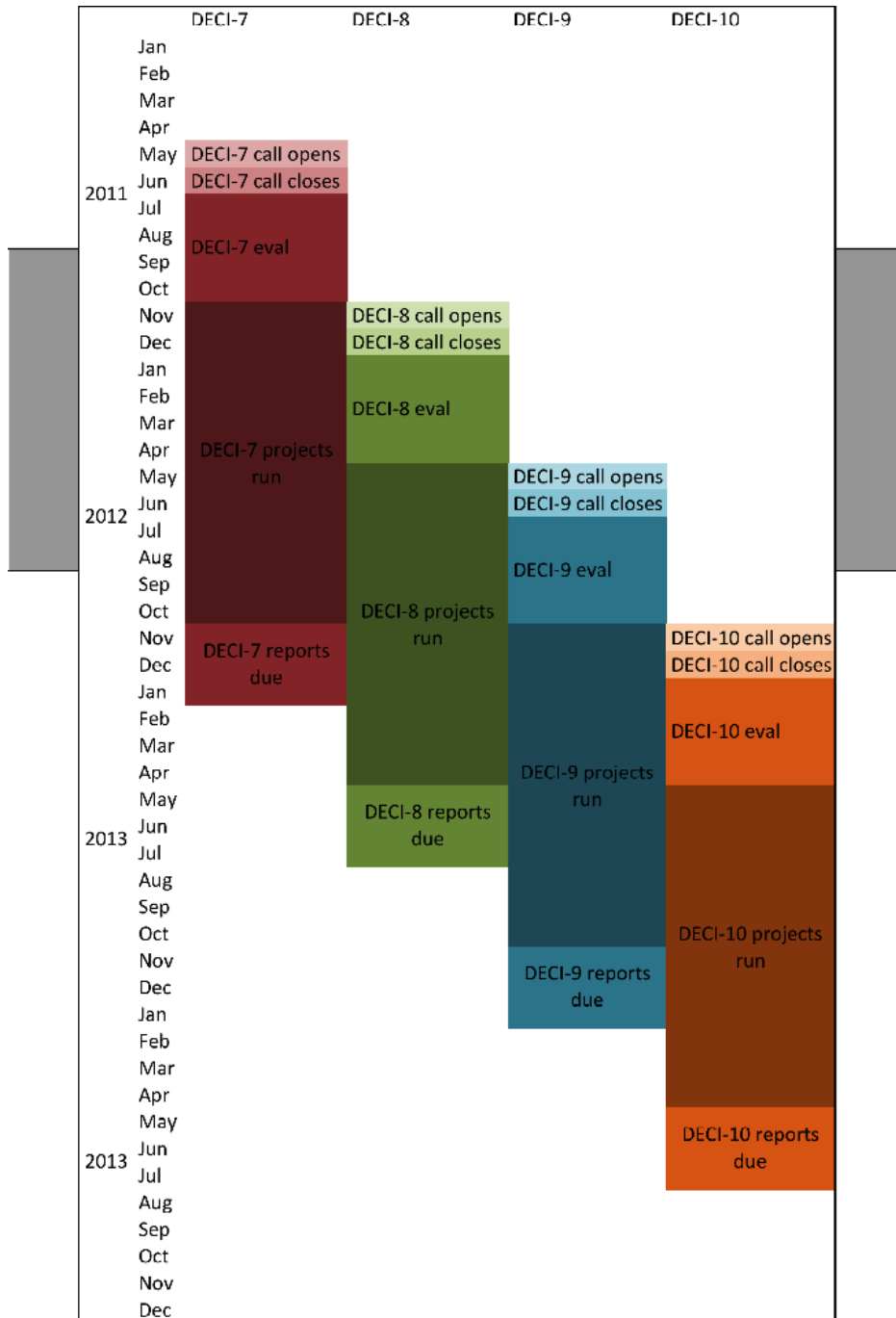


Figure 1: Timeline of DECI calls

2.2.1 DECI-7

The first DECI, DECI-7, was a pilot DECI call which had closed in June 2011 and was coming to the end of the scientific review phase at the beginning of September 2011, when PRACE-2IP started. The process of deciding how many projects to accept then began within task T2.2. The selection of projects and associated resource provision was a complex task based primarily on the principles of scientific excellence and *juste retour* across the countries involved. This process involved a lot of collaboration between the relevant partners to try to balance these two main principles and ensure a fair selection of projects. The assigning of successful projects to machines then took place based on the comments made in the technical evaluation forms together with email discussion. PIs were then informed of the decisions made. This collaboration was achieved with a combination of email communication and video conferencing. After award letters were sent to PIs, the responsibility for making contact with PIs, setting up home site accounts and completing the filling in of the DECI database (DPMDB) was passed to each home site involved. Successful projects were given 12 months to run from 1 November 2011 – 31 October 2012. Enabling work was coordinated by the task 7.2 within WP7. For the remainder of the year, the task 2.2 was responsible for over-seeing the smooth running of projects and day-to-day management of resources. This was achieved via a combination of email and video conferencing.

2.2.2 DECI-8

The DECI-8 call was opened on 2 November 2011 and closed on 10 January 2012. Between the opening and closing of the call PIs could submit proposals and send in queries via an email address which forwarded to all DECI sites. Once the call closed the DECI team agreed which site would act as home site for each of the projects which was mainly for the purposes of filling in the DPMDB and performing the technical evaluation for each proposal. The process of filling in the technical evaluation form was then passed over to the task 7.2 as before. Once the DPMDB entries were completed for each project, the proposals were sent off for scientific evaluation by either the HPC-Europa SUSP or by national scientific panels. From then on the process continued much as for the pilot (DECI-7) call with projects running from 1 May 2012 – 30 April 2013.

2.2.3 DECI-9

The DECI-9 call was opened on 17 April and closed on 30 May 2012. Proposals have undergone technical evaluations (as above) and are in the process of undergoing a scientific evaluation.

2.2.4 DPM Database

The DECI database (DPMDB) has provided the mainstay of the DECI activity with all proposals having their data entered into this database together with links to their technical and scientific evaluations. Successful proposals are then turned into “real” projects in the DPMDB and more details added such as the machines to be used by each project. During the course of a DECI project, information is added to show the status of the project (enabling, performing production runs, completed, etc.) and the number of standard hours consumed by each project is entered. This makes it easy to obtain an overview of the status and progress of projects throughout their lifetime.

2.2.5 Scientific Evaluation Forms

The scientific panels are given a standard form to fill in which is usually pre-filled with some details about the projects. The evaluations are asked to comment on items such as

- how well the proposal matches the call,
- the quality of the proposal,
- the likely impact of the proposed work,
- the applicant's ability in terms of his/her track record and skills, and
- the resources requested.

The panels are finally expected to rank proposals in order of merit for their given set of proposals.

2.3 Scientific Communities

PRACE is currently evaluating the models of operation for its major functions including Tier-0 and Tier-1 access. This work is taking place at the highest level within PRACE, i.e. PRACE Council level. Thus while it was initially envisaged that this Work Package could work towards examining and potentially participating in the deployment of Community Access, the elevation of this and related topics to Council level consideration has pre-empted this. Pending decisions from the Council this Work Package will not progress this work save to enumerate here certain salient points.

To date PRACE has issued numerous calls at both Tier-0 level and Tier-1 level via the DECI programme. A common feature of these calls has been their duration of 1 year from the granting of access. This period is sufficient for many research programmes and is of the order of time typically granted locally by many national HPC centres. However, there is a recognition that it presents difficulties for research programmes with on-going computational needs that operate over longer timeframes. Commonly termed *programme access* this longer-term commitment of resources is often a prerequisite of community access. Community access is a process whereby the granting of resources is devolved to the level of a particular community. That community might be made up of researchers from a single discipline or related disciplines that have a common area of research yet more than one research project. The subdivision of allocated resources between the projects is then a matter for the community itself. Some complexities of this approach are discussed below.

A challenge faced when granting long-term access is the availability of the resource for the period in question. There is a dependence on the long-term sustainability of the infrastructure, see Section 5.3 for further comments in this regard. In addition there is technical difficulty in granting long-term access to a given HPC system, which will have a maximum lifetime of 5 years typically, including a major mid-term upgrade. Thus the operation of a single system throughout the course of an access period may very well not be guaranteed.

There is recent precedent for the existence of Community Access within the European HPC ecosystem. The DEISA DECI programme (see [6]) provided Tier-1 HPC access for a period of seven years ending in April 2011, when certain elements of DEISA were subsumed into PRACE while retaining the DECI moniker. Community Access was not carried over.

Some of the former DEISA Communities have taken part in the PRACE DECI calls, e.g. Planck-LFI which was awarded 3,500,000 std-hours in DECI-7, see Table 3.

Community Access is not without challenges. For example a key issue is that of representation or mandate. For instance, if a given fraction of resources are to be designated for the use of a particular discipline under the auspices of an applicant Community. In

addition to considering the technical and scientific grounds for an application the validity of the implicit claim by applicants that they represent their discipline's community is also in question. Academic rivalries and scientific differences can make this a fraught process. Furthermore as accountable state funded agencies, in the main, PRACE partners must have sufficient insight into a community to satisfy themselves that resource sub-allocation within the project honours principles such as scientific excellence, for example, as would typically be applied when considering conventional PI based grants. Again in the interests of oversight and accountability if projects are to undergo mid-term reviews, or similar, then the process is more complex. By definition more people, who are likely to be in more places over longer periods will be involved in a project thus increasing the burden of a review process on all concerned.

3 Collaboration with WP7 Task 7.2

During the whole DECI process WP2 is in tight collaboration with WP7 Task 7.2 – Applications Support for new DECI Projects. T7.2 has two responsibilities:

- technical evaluations of DECI incoming applications, and
- help with enabling of accepted projects on DECI Tier-1 systems.

While WP2 prepares the DECI call, collects the proposals and coordinates the whole DECI process from start to end, T7.2 has the closest contact with PIs and helps them throughout the whole DECI year. Thus it is crucial to maintain a constant up to date information flow between these two work packages.

3.1 Technical Evaluation Forms

After the closing date of each DECI call the submitted proposals are collected by WP2 in a dedicated folder on BSCW. Afterwards the staff members of T7.2 perform the technical evaluation of these projects, using a template form, specially developed for this purpose. The technical evaluations are completed within two weeks and uploaded to BSCW as well.

As was mentioned in D2.1 [2], each partner reviews the proposals originating from PIs of their own country. This partner is appointed as the proposal's home site. Exceptions to this rule are countries that do not participate in PRACE and proposals that need collaboration between several DECI partners. In these cases proposals are assigned based on geographical proximity of applicants, former contacts with them, and the number of proposals assigned to the sites (to balance effort).

Technical evaluation is currently based on an MS Word document form that was used in the DEISA DECI process, but adapted to the altered layout of the DECI-7 proposal form. These technical evaluations together with the project proposals are sent to the peer review committees by WP2 representatives. Parallel to this T7.2 staff populates the DPMDB (DECI Process Management DataBase) with the applications' technical information to be used in future DECI activities by WP2.

4 Collaboration with PRACE-1IP WP4 Task 4.3

WP2 of PRACE-2IP and WP4 task 4.3 of PRACE-1IP have a lot in common. In both the final aim is to build and maintain a well working Tier-1 infrastructure with sufficient interoperability with Tier-0. Because of the common objectives, the distribution of work

between the work packages has been followed carefully all the time to avoid doing double work.

Before the start of PRACE-2IP in September 2011, the DECI process was in the hands of PRACE-1IP WP4 T4.3, which launched the first DECI pilot call (DECI-7) and arranged technical and scientific reviews for the received proposals. The rest of DECI-7 was handed over to PRACE-2IP WP2. At that point PRACE-1IP WP4 T4.3 took the role of developing the practices, while PRACE-2IP WP2 focused on running them.

At the end of PRACE-1IP in June 2012, PRACE-2IP WP2 took the full responsibility of the DECI process.

5 Workplan for the last 12 Months

The sustainability of an infrastructure over an extended period is a key question that faces any large-scale research infrastructure. In this respect PRACE is no different, as a relatively new entity the financial and use case models that underpin the infrastructure's long-term sustainability in its current form are still evolving. Significant work is underway at the highest levels within PRACE to ensure its existence long into the future. This is necessary if PRACE is to fulfil its potential as a supporting infrastructure to leading edge science, which frequently operates on extended time scales. Furthermore the technical challenges facing those who seek to exploit coming multi-petaflop and indeed exascale hardware require investment in development effort to be sustained over time to effectively tackle what are profound technical challenges.

Possible decisions on forthcoming DECI calls, as an Optional Programme, are taken into account for the work for both tasks 2.1 and 2.2. Also for Task 2.3, the possibility of the implementation of community or multi-year Tier-1 access is considered, see below.

As PRACE-3IP has started in July 2012, the work in WP2 has to be synchronized with it to avoid any redundancy and to achieve the best possible outcome.

5.1 Framework for resource exchange

In the following subsections we will describe what we plan to do in the final year of PRACE-2IP in task 2.1. The goals and consequently the planned activities for the subtasks of T2.1 will depend heavily on two factors:

- the future role of Tier-1 in the PRACE infrastructure (will there be an optional programme for Tier-1?), and
- the outcome and recommendations of Deliverable D4.3.2 of PRACE-1IP [3], which is due in June 2012.

The future role of Tier-1 is still uncertain and the outcome of D4.3.2 has not been analysed yet, so the following might require some adjustments or updates.

5.1.1 *Develop administrative framework for resource exchange between Tier-1 sites to support DECI calls (T2.1.1)*

In this subtask we will identify the processes and the required functionalities of a framework that will be used to keep track of the resources that are available from the Tier-1 sites participating in DECI.

The designed framework should offer the ability to record the formal commitments, the actual contribution and actual consumption per partner, and the allocations and actual usage for each project.

The main aims of the subtask and the associated work plan are the following:

- Define the requirements and the design of tools and processes for efficient handling of the resource exchange between Tier-1 sites to support DECI calls and the accounting framework.
- Evaluate in detail existing tools and if they lack functionality, this subtask will formulate the necessary requirements to include the desired functionality into the tool and the subtask will organize the necessary support from other work packages (especially WP10) to evaluate the possibilities to implement this functionality.

The first action in the second project year will be to investigate whether the DPMDDB (DECI Project Management DataBase) can be used or adapted in such a way that it supports all desired functionality. If the answer is affirmative, T2.1 will coordinate the specification of adaptation of the DPMDDB.

In more detail, T2.1.1 will:

- Identify and describe in detail the drawbacks of the current process, i.e.
 - determine if all necessary technical information is kept in DPMDDB,
 - examine possible issues with the manual insertion of accounting data per month, and
 - minimize the multiple sources of information (MS Excel files).
- Describe requirements based on policy level recommendations and the problems identified in the detailed analysis aiming at automating the process as much as possible.
- Take into account the possible re-definition of existing metrics (standard core hours, additional metrics for contributions (i.e. GPGPUs, storage space, application support, etc.).

An alternative is to incorporate the required functionality into a future automated DECI Submission and Peer Review Tool, avoiding duplication of information over two tools. If this alternative is chosen, T2.1 will formulate all consequences of phasing out the DPMDDB, including transferring historical data to a new tool.

A task force has been set up to improve the DECI proposal and project management infrastructure. This task force, in the context of PRACE-1IP WP4, produced a set of high-level requirements for a web-based DECI project proposal and reporting tool (PPR tool). The exact workflow and the above stated requirements have been documented in D4.3.2 “Cross-National Programme for Tier-1 Access Pilots” of PRACE-1IP [3].

The PPR tools should provide web-based functionality for submitting applications, manage the technical and scientific review of applications, manage the reporting process from successful applicants and support efficient transfer of information to the DECI project management database (DPMDDB), if its functionality will not be incorporated in the PPR tool.

Further to that an evaluation of existing PPR tools is ongoing. This evaluation includes the current PRACE Tier-0 PPR tool as well as the PPR tool used by HPC-Europa [5].

During the remainder of the PRACE-2IP project, WP2 in collaboration with WP10, will further refine the details of the DECI PPR tool requirements and set the goals for the implementation of an efficient DECI proposal and project management infrastructure that will be undertaken by WP10. Effort will be done in order for the PPR tool to be designed in such a

way that it allows for future developments that are compatible with the requirements of the administrative resources exchange framework.

5.1.2 *Analyze options for a possible exchange between Tier-0 and Tier-1 sites (T2.1.2)*

Occasionally during evaluation of DECI proposals the reviewers conclude that the proposal is too big to accommodate within a DECI call and that it should have been directed to the Tier-0 call. It is also evident that the same problem occurs the other way round: a Tier-0 proposal is too small and should have been directed to the DECI call.

In the first year a comparison between the Tier-0 and the Tier-1 DECI process was performed and a number of possibilities were identified to harmonize the two processes (see Section 2.1.3)

In the second year we will follow up on these suggestions and also any suggestions from PRACE-1IP WP4 T4.3.

For instance: the taskforce on DECI tools is currently investigating electronic submission and peer review tools to improve the DECI process. One of the objectives is to deliver a comparison between the proposal submission and review tool that is used in the HPC-Europa project and the Peer Review Tool that is used in the Tier-0 calls. In view of the possible exchange between Tier-0 and Tier-1 sites this subtask will advocate to choose the Tier-0 Peer Review Tool or if another tool is chosen to guard the implementation process so that the option of exchange is kept open.

In the first year the subtask 2.1.2 did not express any thoughts on the issues and consequences for the commitment of resources by partners for the allocation of resources when a proposal is moved between the Tier-0 and Tier-1 DECI call, so this is something that has to be finalized in the second year.

5.1.3 *Refine the pilot practices developed by PRACE-1IP towards production level practices (T2.1.3)*

The resource exchange practice as it is currently used in the PRACE DECI calls (DECI-7, DECI-8 and DECI-9) is constantly reviewed and adapted to new insights. This subtask will continue to do so. . A lot of work will be invested in the development of an electronic proposal submission and peer review tool to replace the current practice of proposal submission and evaluation using MS Word documents. Although the majority of implementation work will be done by WP10, it still needs a lot of effort from WP2 also, to assist in choosing the optimal PPR tool and to assist in designing the web forms and underlying database to the wishes and requirements of DECI staff. The option to harmonize the currently separated processes for obtaining Tier-0 and Tier-1 access will be an important consideration in choosing an appropriate tool for this.

Major changes in the *juste retour* principle fall outside the scope of this subtask.

5.1.4 *Create contracts, processes and exchange policies (T2.1.4)*

The current planning is to introduce the resource provider agreements before the commitments from all partners for the DECI-9 call are definite. When all partners have signed the agreement this subtask will evaluate if the current document suffices and if necessary will adapt the document so it can be used for future DECI calls.

The subtask will also look into other “exchange policies” as an alternative to the currently employed *juste retour* principle, again dependent on the outcome of the D4.3.2 of PRACE-1IP [3].

5.1.5 *Study new usage models for Tier-0 and Tier-1 resources (T2.1.5)*

This subtask will formulate and implement pilot projects for

- industrial access,
- preparatory access to Tier-1 resources, and
- community access to Tier-1 resources,

in accordance with the recommendations that come out of Deliverable 4.3.2 from PRACE-1IP [3] and in collaboration with WP9 (Industrial Application Support).

The subtask will also formulate procedures to obtain resources for these types of access to Tier-1 infrastructure, recognizing that these resources probably cannot be based on the *juste retour* principle. For community access this is obvious as communities do not have a well defined “home” site. Several partners may have prohibitions to facilitate industrial access, which also may strain the *juste retour* principle. Only for preparatory access the *juste retour* principle can conceivably be retained, but this has to be investigated further.

5.1.6 *Investigate flexible resource exchange policies for load balancing between sites and over time (T2.1.6)*

This subtask will follow up on recommendations of Deliverable 4.3.2 of PRACE-1IP [3]. Options:

- keep current practice of conversion factors (with changes necessary to include new technologies e.g. GPUs),
- switch over to expressing everything by monetary value,
- use both monetary values (to measure commitments and allocations) and conversion factors (to convert requested CPU core hours into monetary currency), or
- partners will volunteer Tier-1 resources to PRACE without immediate benefit for (i.e. abandon the *juste retour* principle).

5.2 DECI

Over the next year we will see the ending of the DECI-7 projects, the continuations of the DECI-8 projects and the starting of DECI-9 projects. We probably also see the opening of the call of DECI-10. The processes for opening calls, selecting projects and the starting and running of projects will continue much as before in principle. However, as discussed elsewhere, we are planning the implementation of a new submission tool which will affect the way in which the DECI are managed. The same basic principles will be applied, i.e. a call opening followed by a closing deadline, technical and scientific evaluation, project selection, machine assignment and eventual starting of the projects. However, most of this process will be dealt with using the online submission tool rather than a combination of email, MS Word/PDF documents and the BSCW. Although this will mean staff will have to learn a new system, experience within the HPC-Europa project and Tier-0 shows that the benefits far outweigh the relatively small amount of time it will take to learn the new tools.

The DECI-7 pilot call will see the first set of the DECI projects finish their production runs. We will give projects 3 months to produce their end of project paperwork and reports and remove their data from our systems allowing us to close accounts and free up space on our

systems for new projects. Paperwork will be stored within the BSCW and linked in from the DPMDB but it is hoped that when the new submission tool comes on-line this will also handle all end of project documents.

5.3 Scientific Communities

PRACE has grown with time and now encompasses 24 countries, with some countries currently going through the formal process of joining. This diversity results in a wide array of priorities and capabilities within the partner countries. One proposal has been that in the future programmes or facets of programmes would be implemented as so called “Optional Programmes”, the aim being to allow partners to make best advantage of their particular resources and national strengths. One could consider a scenario whereby Community Access could be offered on an optional basis by a subset of partners at Tier-1 and or Tier-0 level. It would remain for PRACE to ensure that this was a transparent and navigable process for applicants who would be interested in the service provided but most likely not the make-up of its provision. Please note that this remains merely a proposal at this point, but it is indicative of the nature of proposals being considered at PRACE Council level. It is expected that initial direction from Council may follow shortly after the submission of this deliverable in October 2012.

6 Overview of DECI-7 Projects

DECI-7 was started as a pilot DECI call by PRACE-1IP WP4. The call was launched in May 2011. A summary of the proposals has been reported in the deliverable D2.1 of PRACE-2IP [2].

6.1 Projects by Application Area

As can be seen from the table below, applications were received from a diverse range of disciplines requesting over 200 million std-hours of computing time over the 54 proposals. Over 90 million std-hours were granted across 35 projects accepted. The Materials and Bio sciences accounted for more than half of the proposals received in terms of both number of proposals and time requested, see Table 1 and Figure 2. These two disciplines cover most of the Chemistry-related proposals.

Scientific discipline	Proposals received	std-hours requested	Proposals accepted	std-hours granted
Astro Sciences	10	47,650,000	7	17,650,001
Bio Sciences	11	39,867,430	7	20,898,190
Earth Sciences	5	20,063,148	3	8,413,148
Engineering	7	24,362,500	5	14,850,000
Materials Science	18	68,350,250	11	22,308,500
Plasma & Particle Physics	3	11,330,000	2	6,500,000
Total	54	208,980,828	35	90,619,838

Table 1: Proposals received for DECI-7 together with proposals accepted

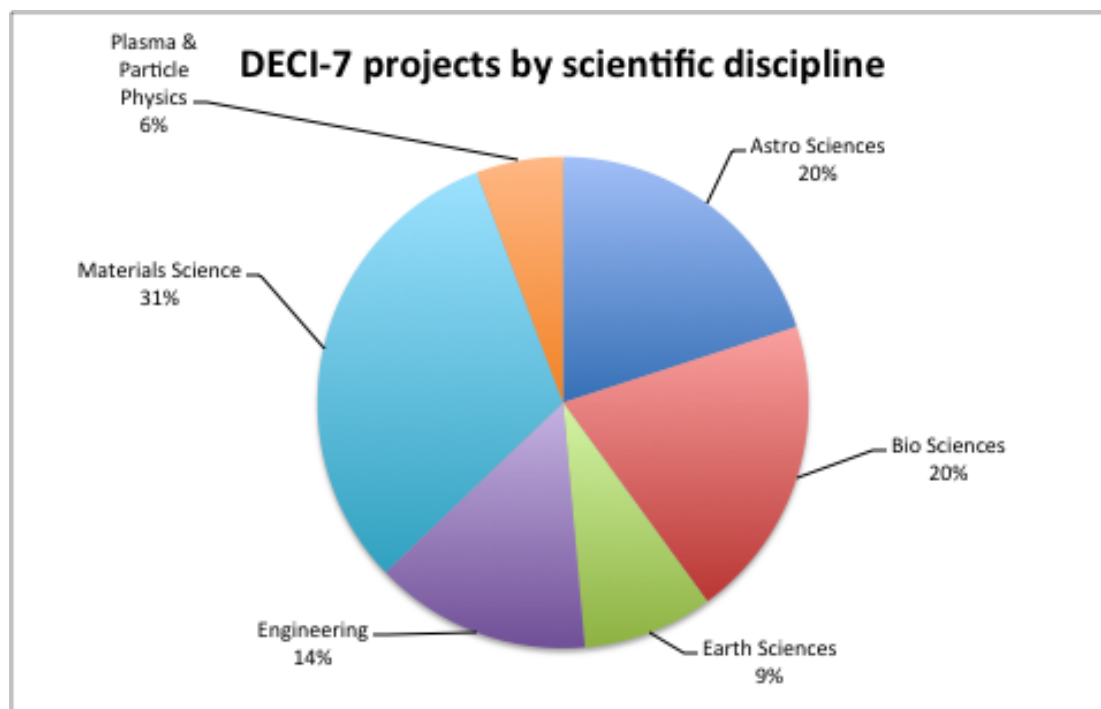


Figure 2: DECI-7 projects shown by percentage awarded by scientific discipline

6.2 Projects by Nationality of Applicants

Proposals were received from 17 different European countries with Italy receiving the highest number of all, see Table 2.

Country of PI	Number of PIs
Austria	1
Belgium	2
Cyprus	1
Finland	3
France	3
Germany	8
Greece	1
Hungary	1
Ireland	2
Italy	11
Poland	1
Portugal	3
Spain	2
Sweden	3
Switzerland	2
The Netherlands	4
UK	6
Total	54

Table 2: DECI-7 Proposals by country of origin

6.3 Resources Allocated

The following table, Table 3, shows the successful DECI-7 projects together with the amount of computing time each project was awarded, the home site that dealt with the administrative side of the project and a list of execution sites where the projects actually ran. The average awarded time for a DECI-7 project is 2,589,143 std-hours.

Internal/ External	DECI project	Computational resources awarded (core-hours)	DECI home site	DECI execution site(s)
External	PICKH	1,500,000	CINES/IDRIS	CINECA
External	DIIVIB	1,080,000	HLRS	CINECA,SARA
External	VIRonSAMs	4,480,000	HLRS	CINES/IDRIS,CINECA
External	BlackHoles	4,200,000	BSC	PSNC
External	PHOTMAT	5,062,500	HLRS	PSNC,CINES/IDRIS
Internal	CatDesign	1,292,000	BSC	LRZ,PSNC SGI
Internal	MIXTUDI	3,750,000	CINECA	FZJ,CINECA
Internal	MAESTRO	2,000,000	CINECA	CINES/IDRIS
Internal	SCW	1,410,000	CINECA	LRZ
Internal	PETAHUB	1,800,000	CINECA	NCSA,PDC
Internal	NUWCLAY	1,500,000	CINES/IDRIS	CINECA
Internal	ElmerIce	1,400,000	CINES/IDRIS	PDC
Internal	WESF	1,200,000	CINES/IDRIS	RZG,CSC
Internal	Planck-LFI	3,500,000	CSC	CSC
Internal	TanGrin	3,500,000	CSC	EPCC

Internal	EC4aPDEs-2	2,500,000	EPCC	BSC,CSC,HLRS,CINES/IDRIS
Internal	HYDROGEN-ILs	1,314,000	EPCC	PDC
Internal	HELIXKINETICS	2,713,190	EPCC	ICHEC,FZJ
Internal	HIFLY	2,100,000	EPCC	PSNC
Internal	HIGHQ2FF	5,000,000	FZJ	PDC
Internal	NR-NSNS-BHNS	3,000,000	FZJ	CSC
Internal	LGICTAMD	3,024,000	ICHEC	ICHEC
Internal	NANOBIO-2	2,000,000	ICHEC	HLRS,CINES/IDRIS
Internal	CASIMIR	3,263,148	LRZ	SARA
Internal	DiSMuN	3,750,000	PDC	PDC,SARA
Internal	SIVE-2	6,250,000	PDC	EPCC
Internal	MUSIC	231,000	PDC	CINES/IDRIS
Internal	SPIESM	3,750,000	PDC	PDC
Internal	SIMONA	600,000	PSNC	SARA,PSNC,CINES/IDRIS
Internal	ARTHUS-3	2,750,000	RZG	FZJ
Internal	EUTERPE-4	1,500,000	RZG	FZJ
Internal	SMARC	700,000	RZG	LRZ
Internal	LASIPROD	700,000	RZG	LRZ
Internal	RBflow-2	6,000,000	SARA	RZG,SARA
Internal	HRPIPE	1,800,000	SARA	PDC
Total		90,619,838		

Table 3: DECI-7 Projects by home site showing execution site and resources awarded

7 Overview of DECI-8 Proposals and Projects

As for the DECI-7 call, the Materials and Bio Sciences received the largest proportion of proposals both in terms of number of proposals and requested computing time, see Table 4.

Scientific discipline	Proposals received	std-hours requested	Proposals accepted	std-hours granted
Astro Sciences	1	9,604,000	1	6,200,054
Bio Sciences	21	70,999,812	13	39,229,860
Earth Sciences	2	5,042,400	2	5,042,400
Engineering	8	68,811,520	6	22,512,720
Materials Science	15	85,371,444	9	20,913,527
Plasma & Particle Physics	2	7,400,000	2	4,754,965
Total	49	237,625,176	33	98,653,526

Table 4: Proposals received for DECI-8 together with proposals accepted

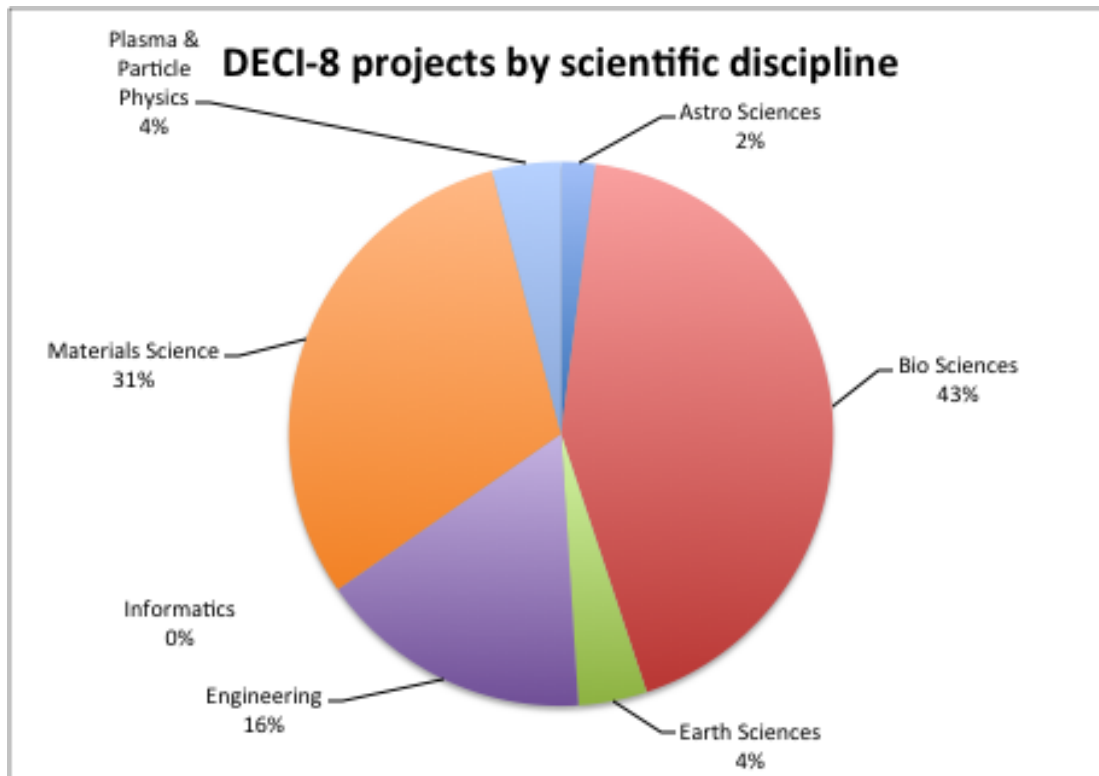


Figure 3: DECI-8 projects shown by percentage awarded by scientific discipline

Proposals were received from 13 different European countries with Italy again receiving the highest number of proposals, see Table 5.

Country of PI	Number of PIs
Belgium	2
Denmark	1
Finland	3
France	3
Germany	6
Ireland	3
Italy	11
Poland	3
Spain	3
Sweden	6
Switzerland	1
The Netherlands	3
UK	4
Total	49
Country of PI	Number of PIs

Table 5: DECI-8 Proposals by country of origin

As for DECI-7, the following table, Table 6, shows the successful DECI-8 projects together with the amount of computing time each project was awarded, the home site that dealt with the administrative side of the project and a list of execution sites where the projects actually ran. The average awarded time for a DECI-8 project is 2,771,337 std-hours.

internal/external	DECI project	Computational resources awarded (core hours)	DECI home site	DECI execution site(s)
external	CIO2_deg	3,240,000	BSC	CINES, UYBHM
external	FULLDRUG	4,648,000	BSC	EPCC
external	MOLED	1,502,000	IDRIS	CSC, ICHEC
external	NanoTherm	3,920,000	SARA	EPCC, SARA
external	Photoreception	10,500,000	CSC	FZJ, HLRS, LRZ, RZG
internal	CANONS	3,125,000	PDC	CSCS
internal	CoMoPro	330,000	IDRIS	RZG
internal	CONTRAR	3,040,000	EPCC	PDC
internal	CYTODYN	4,200,000	CSC	PDC
internal	DrugEffluxMechanism	1,450,000	CSCS	IDRIS
internal	ELORBIC	810,000	PSNC	SARA
internal	EUTERPE-5	3,754,968	RZG	FZJ
internal	FFF	3,744,000	LRZ	CINECA
internal	LASIPROD-2	1,967,790	RZG	IDRIS, PDC
internal	LBglaSS	998,400	CINECA	CINECA
internal	MBIOMARK	1,875,000	PDC	CSCS
internal	MLMJTAX	270,000	PSNC	UYBHM
internal	NAHUJ	1,720,320	CINECA	CINECA, PSNC
internal	NELC	3,565,044	PSNC	EPCC
internal	OPTOCHIMEMD	3,000,000	CINECA	CSCS, SARA
internal	PARAMETER	4,200,000	CSC	EPCC
internal	PIPETURB	6,250,000	PDC	CSC, EPCC
internal	PLANETESIM	6,200,054	PDC	FZJ, ICHEC, RZG
internal	POEMatCASP	1,400,000	HLRS	CINES
internal	POLARIZABLEFOLDBIND	2,738,400	EPCC	PDC
internal	RCR2CP	842,400	ICHEC	PDC
internal	SARCEMS	945,000	ICHEC	ICHEC
internal	SMARTWING	5,600,000	CINES	ICHEC, PSNC
internal	TiO2-Interface	2,746,483	ICHEC	UYBHM
internal	TLRSim	3,200,000	EPCC	CSCS
internal	TRANSPART	4,200,000	SARA	PDC
internal	VIPforVPH	1,670,670	IDRIS	EPCC
internal	WFNUC	999,997	CINECA	CSCS, RZG
Total		98,653,526		

Table 6: DECI-8 Projects by home site showing execution site and resources awarded

8 Overview of DECI-9 Proposals

For DECI-9 45 proposals have been received and are presently under scientific review. A summary of the proposals is given here, see Table 7, Figure 4, and Table 8. Proposals are still at the review stage and not all the details about resources requested are available at the time of writing.

Scientific discipline	Proposals received
Astro Sciences	5
Bio Sciences	11
Chemistry	7
Earth Sciences	2
Engineering	3
Materials Science	13
Plasma & Particle Physics	4
Total	45

Table 7: Proposals received for DECI-9 by scientific discipline

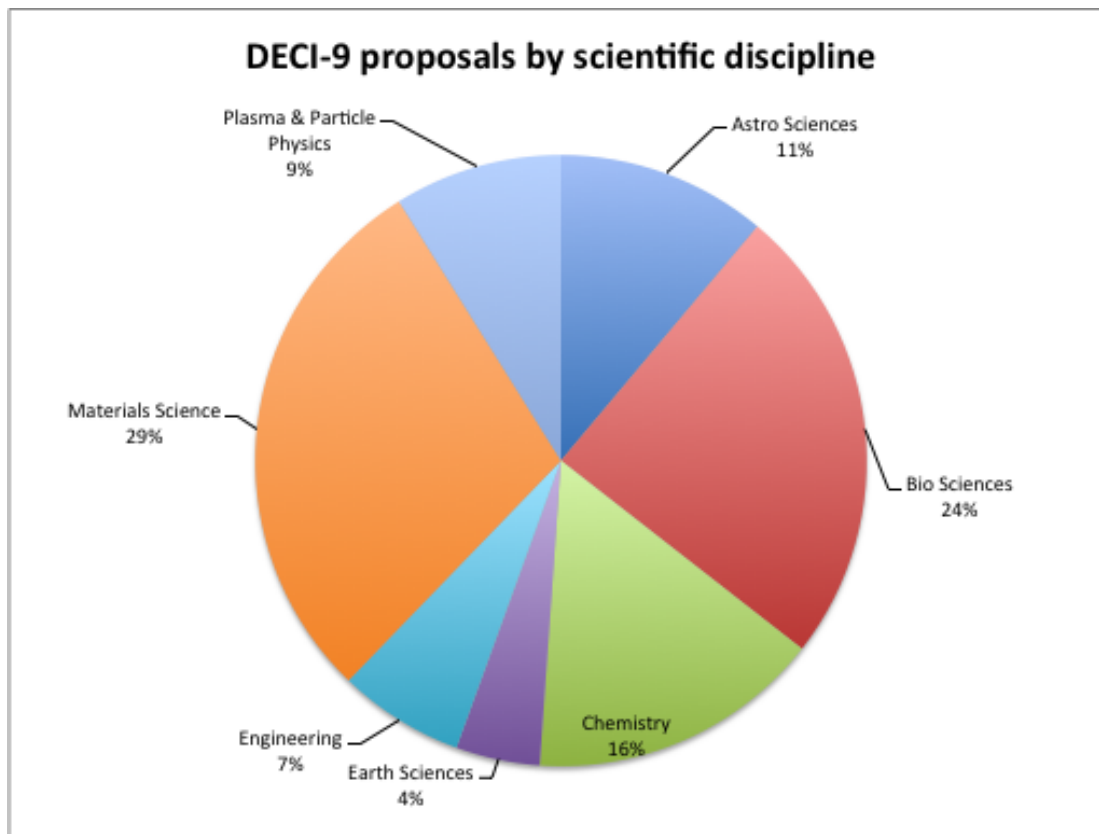


Figure 4: DECI-9 proposals shown by percentage awarded by scientific discipline

Internal/External	DECI project	DEISA home site
External	COIMBRALATT	BSC
External	NMRCONF	CSC
External	TB-Drugs-In_silico	FZJ
External	SPSC	SARA
Internal	SpEcBNS	BSC
Internal	ICREIMUTANTS	BSC
Internal	CuCeCat	BSC
Internal	FMG	BSC
Internal	WGSCat	BSC
Internal	DOPE	CINECA
Internal	GPCR4D	CINECA
Internal	iMIG	CINECA
Internal	IONGATE	CINES
Internal	AuPd-Seg	CINES
Internal	HIPEG-GEMS	CINES
Internal	FORSQUALL	CINES
Internal	NPR-LQCD	CINES
Internal	Planck-LFI2	CSC
Internal	CompSym	CSC
Internal	C+WDM	CSCS
Internal	LCRR	CSCS
Internal	PRECDYN	CSCS
Internal	GPCR_Depression	EPCC
Internal	LBSCOM	EPCC
Internal	MoMoGal	FZJ
Internal	AiTransConFiG-2	FZJ
Internal	PAMOP	FZJ
Internal	Reactive_Ceria	ICHEC
Internal	Si-Interfaces	ICHEC
Internal	SPH-WEC	ICHEC
Internal	NCSA-PB	NCSA
Internal	AIMD-PAF	NCSA
Internal	CMISM	PDC
Internal	CoStAFuM	PDC
Internal	DifVib	PDC
Internal	HydFoEn	PDC
Internal	MultiSim-TurbTFP	PDC
Internal	GanDaLF	RZG
Internal	PTACRB	RZG
Internal	ESM4OED	RZG
Internal	HiSSor	UYBHM
Internal	2DSTRUCT	UYBHM
Internal	MPI-FETI	VSB-TUO
Internal	NPT_MC	VSB-TUO
Internal	GRAPHMAT	WCSS

Table 8: DECI-9 Proposals by home site

9 Analysis of Tier-1 Resources

For the pilot DECI call, DECI-7, 15 sites contributed resources spread over 17 different machines. Of these sites, ICHEC (Ireland), CINES (France), NCSA (Bulgaria) and PSNC (Poland) had not taken part in DECI under DEISA so were completely new to DECI, see Table 9.

For DECI-8, there were also 15 contributing partners and 19 machines were involved. BSC (Spain) opted not to contribute computing resources but will contribute time under DECI-9. NCSA (Bulgaria) opted not to contribute time as they had contributed their yearly resources for DECI-7. The resources for Poland in DECI-8 were contributed by WCNS (Wroclaw Centre for Networking and Supercomputing) rather than PSNC. CSCS (Switzerland) contributed resources for DECI-8 but had also contributed under DEISA. UYBHM (Turkey) were completely new to DECI in DECI-8.

Centre	Country	DECI-7	DECI-8
		std-hours contributed	std-hours contributed
BSC	Spain	1,520,000	-
CINECA	Italy	6,410,000	6,410,000
CINES	France	4,920,000	2,560,000
CSC	Finland	7,617,400	3,197,600
CSCS	Switzerland	-	11,250,000
EPCC	UK	9,750,000	19,734,528
FZJ	Germany	8,700,000	8,700,000
HLRS	Germany	2,195,200	2,195,200
ICHEC	Ireland	4,541,184	4,541,184
IDRIS	France	2,368,143	2,368,143
LRZ	Germany	3,736,200	3,736,200
NCSA	Bulgaria	947,100	-
PDC	Sweden	15,936,250	15,936,250
PSNC	Poland	9,536,119	-
RZG	Germany	4,397,760	5,722,760
SARA	The Netherlands	8,196,000	2,640,000
UYBHM	Turkey	-	6,727,680
WCNS	Poland		4,086,990
	Total	90,771,357	99,806,535

Table 9: Contributions from partners for DECI-7 and DECI-8

For DECI-9, the plan is for the following sites to contribute computing resources: BSC (Spain), CINECA (Italy), CINES (France), CSC (Finland), CSCS (Switzerland), Cyfronet (Poland), EPCC (UK), FZJ (Germany), ICE-CSE (UK), ICHEC (Ireland), ICM (Poland), IDRIS (France), NCSA (Bulgaria), PDC (Sweden), PSNC (Poland), RZG (Germany), SARA (The Netherlands), SIGMA (Norway), UYBHM (Turkey) and WCNS (Poland).