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**PRACE Fifth Implementation Phase Project**

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**Report on PRACE 2, TNA and DECI Year 2**

***Final***

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## List of Acronyms and Abbreviations

aisbl	Association International Sans But Lucratif (legal form of the PRACE-RI)
BoD	PRACE Board of Directors
BMBF	Bundesministerium für Bildung und Forschung, Germany
CPU	Central Processing Unit
DECI	Distributed European Computing Initiative
DoA	Description of Action (formerly known as DoW)
DPMDB	DECI Project Management Database
EC	European Commission
ESFRI	European Strategy Forum on Research Infrastructures
EUDAT	European Data Infrastructure
GDPR	General Data Protection Regulation
GÉANT	Collaboration between National Research and Education Networks to build a multi-gigabit pan-European network. The current EC-funded project as of 2015 is GN4
GP	PRACE General Partners
GPU	Graphic Processing Unit
H2020	Horizon 2020
HLST	High Level Support Team
HM	PRACE Hosting Members
HPC	High Performance Computing; Computing at a high performance level at any given time; often used synonym with Supercomputing
HPCCC	HPC Competence Centre
HPL	High Performance LINPACK
IAC	PRACE Industrial Advisory Committee
ISC	International Supercomputing Conference; European equivalent to the US based SCxx conference. Held annually in Germany.
JU	Joint Undertaking
KPI	Key Performance Indicator
LINPACK	Software library for Linear Algebra
MB	Management Board (highest decision making body of the project)
MESRI	Ministère de l'Enseignement supérieur, de la Recherche et de l'Innovation, France
MS	Member States
NDA	Non-Disclosure Agreement. Typically signed between vendors and customers working together on products prior to their general availability or announcement.
OP	PRACE Optional Programme
PA	Preparatory Access (to PRACE resources)
PTC	PRACE Training Centres
PI	Principal Investigator
PMO	Project Management Office
PPR	PRACE Peer Review
PRACE	Partnership for Advanced Computing in Europe; Project Acronym
PRACE 1	The initial period of the PRACE Research Infrastructure
PRACE 2	The second period of the PRACE Research Infrastructure following the initial five year period.
RI	Research Infrastructure

RIA	Research an Innovation Action, an H2020 funding scheme
SC	Supercomputing Conference; US equivalent to the European based ISCxx conference. Held annually in US
SHAPE	PRACE SME HPC Adoption Programme in Europe
SME	Small and medium-sized enterprises
SSC	PRACE Scientific Steering Committee
SWG	PRACE Strategy Working Group
TB	Technical Board (group of Work Package leaders)
TCO	Total Cost of Ownership
Tier-0	Denotes the apex of a conceptual pyramid of HPC systems. In this context the Supercomputing Research Infrastructure would host the Tier-0 systems; national or topical HPC centres would constitute Tier-1
Tier-1	National or topical HPC centres
TNA	Trans-National Access
WG	Working Group
WP	Work Package

### List of Project Partner Acronyms

BADW-LRZ	Leibniz-Rechenzentrum der Bayerischen Akademie der Wissenschaften, Germany (3 <sup>rd</sup> Party to GCS)
BILKENT	Bilkent University, Turkey (3 <sup>rd</sup> Party to UYBHM)
BSC	Barcelona Supercomputing Center - Centro Nacional de Supercomputacion, Spain
CaSToRC	Computation-based Science and Technology Research Center, Cyprus
CCSAS	Computing Centre of the Slovak Academy of Sciences, Slovakia
CEA	Commissariat à l'Énergie Atomique et aux Énergies Alternatives, France (3 <sup>rd</sup> Party to GENCI)
CESGA	Fundacion Publica Gallega Centro Tecnológico de Supercomputación de Galicia, Spain, (3 <sup>rd</sup> Party to BSC)
CINECA	CINECA Consorzio Interuniversitario, Italy
CINES	Centre Informatique National de l'Enseignement Supérieur, France (3 <sup>rd</sup> Party to GENCI)
CNRS	Centre National de la Recherche Scientifique, France (3 <sup>rd</sup> Party to GENCI)
CSC	CSC Scientific Computing Ltd., Finland
CSIC	Spanish Council for Scientific Research (3 <sup>rd</sup> Party to BSC)
CYFRONET	Academic Computing Centre CYFRONET AGH, Poland (3 <sup>rd</sup> party to PNSC)
EPCC	EPCC at The University of Edinburgh, UK
ETHZurich (CSCS)	Eidgenössische Technische Hochschule Zürich – CSCS, Switzerland
FIS	Faculty Of Information Studies, Slovenia (3 <sup>rd</sup> Party to ULFME)
GCS	Gauss Centre for Supercomputing e.V., Germany
GENCI	Grand Equipement National de Calcul Intensiv, France
GRNET	Greek Research and Technology Network, Greece
INRIA	Institut National de Recherche en Informatique et Automatique, France (3 <sup>rd</sup> Party to GENCI)
IST	Instituto Superior Técnico, Portugal (3 <sup>rd</sup> Party to UC-LCA)

IT4Innovations	IT4Innovations National supercomputing centre at VŠB-Technical University of Ostrava, Czech Republic
IUCC	Inter University Computation Centre, Israel
JUELICH	Forschungszentrum Juelich GmbH, Germany
KIFÜ (NIIFI)	Governmental Information Technology Development Agency, Hungary
KTH	Royal Institute of Technology, Sweden (3 <sup>rd</sup> Party to SNIC)
LiU	Linköping University, Sweden (3 <sup>rd</sup> Party to SNIC)
NCSA	National Centre For Supercomputing Applications, Bulgaria
NTNU	The Norwegian University of Science and Technology, Norway (3 <sup>rd</sup> Party to SIGMA)
NUI-Galway	National University of Ireland Galway, Ireland
PRACE	Partnership for Advanced Computing in Europe aisbl, Belgium
PSNC	Poznan Supercomputing and Networking Center, Poland
RISCSW	RISC Software GmbH
RZG	Max Planck Gesellschaft zur Förderung der Wissenschaften e.V., Germany (3 <sup>rd</sup> Party to GCS)
SIGMA2	UNINETT Sigma2 AS, Norway
SNIC	Swedish National Infrastructure for Computing (within the Swedish Science Council), Sweden
STFC	Science and Technology Facilities Council, UK (3 <sup>rd</sup> Party to EPSRC)
SURFsara	Dutch national high-performance computing and e-Science support center, part of the SURF cooperative, Netherlands
UC-LCA	Universidade de Coimbra, Laboratório de Computação Avançada, Portugal
UCPH	Københavns Universitet, Denmark
UHEM	Istanbul Technical University, Ayazaga Campus, Turkey
UiO	University of Oslo, Norway (3 <sup>rd</sup> Party to SIGMA)
ULFME	Univerza V Ljubljani, Slovenia
UmU	Umea University, Sweden (3 <sup>rd</sup> Party to SNIC)
UnivEvora	Universidade de Évora, Portugal (3 <sup>rd</sup> Party to UC-LCA)
UPC	Universitat Politècnica de Catalunya, Spain (3 <sup>rd</sup> Party to BSC)
UPM/CeSViMa	Madrid Supercomputing and Visualization Center, Spain (3 <sup>rd</sup> Party to BSC)
USTUTT-HLRS	Universitaet Stuttgart – HLRS, Germany (3 <sup>rd</sup> Party to GCS)
WCNS	Politechnika Wroclawska, Poland (3 <sup>rd</sup> Party to PNSC)



## Executive Summary

This deliverable reports on three main activities of Work Package 2 (WP2) during the second reporting period of the PRACE-5IP project:

- Status of PRACE 2 development;
- Analysis of PRACE compliance with the Trans-National Access mechanism;
- Analysis of the DECI (Distributed European Computing Initiative) process.

The reporting on the PRACE 2 status within the PRACE Implementation Phase projects was initiated during PRACE-4IP (D2.2 “Second Report on PRACE 2.0 Development” [1]), continued during PRACE-5IP first project year (D2.1 “Report on PRACE 2, TNA, DECI and KPIs Year 1”, M16 [2]) and this deliverable provides an update on the activities of the second year of the PRACE-5IP project. It reports on the status of the implementation and developments in the Second Period of operations of the PRACE pan-European Research Infrastructure, called PRACE 2, that succeeds between 2017 and 2020 the PRACE agreement for the Initial Period (referred to as PRACE 1 in this deliverable).

The Trans-National Access (TNA) topic became a topic of interest for PRACE during the PRACE-5IP project proposal and was addressed for the first time in deliverable D2.1 mentioned above. The objective of the analysis carried out by WP2 and reported in D2.1 was to evaluate if the current processes in PRACE are compliant with the TNA conditions set by the EC as a funding mechanisms for infrastructures offering access to their services to researchers across Europe. The conclusion of that analysis is that access to PRACE resources is already compatible with the Rules for providing Trans-National Access to Research Infrastructures of H2020 (Article 16 of the Model Grant Agreement [3]). To finalise the TNA exercise, this deliverable will report on the Tier-0 allocations, during the PRACE-5IP project.

A further topic of interest in PRACE-5IP is the DECI process. This deliverable is an update of the DECI report from D2.1, focusing this time on the WP2 analysis related to possible actions that could be implemented in DECI towards improving the process and thus better serving academic and industrial Tier-1 users.

## 1 Introduction

During the second year of PRACE-5IP, WP2 continued providing major support to the PRACE aisbl, Council and the PRACE Board of Directors (BoD) in order to further identify and analyse the different elements of PRACE 2. Furthermore, WP2 provided support to the DECI process, further analysed data protection issues at the Project level and at the RI level, and finalised the analysis of the PRACE compliance with the Trans-National Access mechanism.

This deliverable, describing the activity of WP2 during the second year of the PRACE-5IP project, is structured as follows:

- Section 2, after recalling the mission and objectives of PRACE, concentrates on the PRACE 2 Programme with detailed analysis of the PRACE 2 Project Access calls, a first report on High Level Support Teams (HLSTs) and the forward-looking software solutions mini-projects selection. Aspects related to PRACE's future relationship to EuroHPC are addressed and PRACE services which can be offered to EuroHPC are highlighted and further analysed;
- Section 3 mainly reports on the legal support provided by WP2 regarding the adaptation of PRACE policies to the new European legislation on Data Protection, at Project and RI level. Direct legal support was also performed to PRACE aisbl on several topics of current relevance – such as the establishment of a student mobility programme and recommendations and establishment of a Code of Conduct in parental leave or other career breaks. Arising issues of a legal nature in the different work packages of the PRACE-5IP project were also addressed;
- Section 4 finalises the TNA exercise initiated in the D2.1 of PRACE-5IP project and reports on the Tier-0 allocations, during the PRACE-5IP project;
- Section 5 presents the processes involved in DECI, this time focusing on the WP2's analysis related to possible actions that could be implemented in DECI towards improving the process and thus better serving academic and industrial Tier-1 users;
- Finally, some conclusions are drawn in Section 6.

For some of the analyses presented in this deliverable, WP2 consulted the legal advisor firm Bird & Bird LLP assisting PRACE.

## 2 Mission and Objectives of PRACE

The overarching goal of PRACE is to provide a federated European supercomputing infrastructure that is science driven and globally competitive. It aims to strengthen European science by providing access to high-end computing and data analysis resources, which will help drive discoveries and new developments in all areas of science, including mathematics, computer sciences, medicine, and engineering, social sciences and digital humanities. The goal of these actions is to help create a fertile basis for research, technology development and industrial competitiveness in Europe.

In order to reach this goal, PRACE aisbl has set up the integrated PRACE 2 programme, relying on the contribution of all the PRACE partners, with the following objectives:

- To provide a world-class HPC and data infrastructure available to European researchers in science and industry comprised at any one time of leadership-class pan-European systems, interlinked with an underlying network of national and regional systems;
- To develop an architecturally diverse supercomputing infrastructure that no individual country could afford, in order to enhance European competitiveness;
- To foster international collaborations on the forefront of high-end computing in simulation and data science and to bring competence to the PRACE member states;
- To help develop Europe by promoting the European idea of bringing stability and peace through open scientific discourse between all members;
- To enhance the scientific output of the supercomputing systems through international Tier-0 allocations coupled with the assistance of the local High Level Support Teams (HLSTs);
- To foster healthy research competition through the unique and purely scientific review based process that pushes scientists to the top;
- To stimulate the deployment of HPC in the knowledge economy in Europe and help European industry to become more competitive.

### 2.1 PRACE 2 Programme Report

PRACE was created on 23 April 2010 under the provisions of the “Agreement for the Initial Period”, where four countries committed to invest and make available to PRACE a total of 400 million Euro in HPC resources, considering investment and operations, along five years. Contributions from these four countries to the so-called PRACE 1 Programme started gradually, (Germany in 2010, France in 2011, Italy in 2012 and Spain in 2013) and will be fully completed during 2019.

After seven years of operation and a major fraction of this commitment executed, the PRACE Council certified the continuation of the European HPC infrastructure on its 25<sup>th</sup> meeting, on 3 March 2017. The PRACE 2 Programme includes now the commitment of five countries (France, Germany, Italy, Spain and Switzerland) to contribute 40% of the capacity of their world-class Tier-0 HPC systems through PRACE. This has represented a 2.5x increase of the resources made available through PRACE calls, from less than 800 million core hours awarded in Call 13 to over 2 billion core hours awarded in Call 14. As a new development, the PRACE 2 Programme includes a new support scheme named High Level Support Teams (HLSTs) programme, created with the objective of providing European scientific communities with support in code enabling and

optimisation of scientific applications, in order to fully benefit from the performance of PRACE HPC Tier-0 systems.

The PRACE 2 Programme has allowed Europe to remain competitive in the global HPC race, reaching an aggregated peak performance of 110 PFLOP/s, in the same order of magnitude of the most powerful systems in the world. This leadership position is pivotal to fully benefit from the strong investments that Europe will contribute through the recently created EuroHPC Joint Undertaking (JU), with an initial budget of 1.4 billion Euros for its first phase.

The strong success of the PRACE 2 Programme has also served to enlarge the partnership. Austria recently re-joined PRACE, leading to a total of 26 members in the PRACE association, 24 of which are active contributors to the PRACE 2 Programme.

### 2.1.1 PRACE 2 Project Access Calls

PRACE has opened five Project Access calls within the PRACE 2 Programme, with a sustained offer of resources close to 4 billion core hours per year. This has represented a substantial increase of resources, as compared to the 1.5 billion core hours awarded in the previous year. Such an increase has been possible with the contributions of all PRACE Hosting Members (HMs) and their recently upgraded systems.

PRACE calls follow a biannual schedule and the resources offered by PRACE, adjusted in time to the start of each call, can be assigned to years according to the following table:

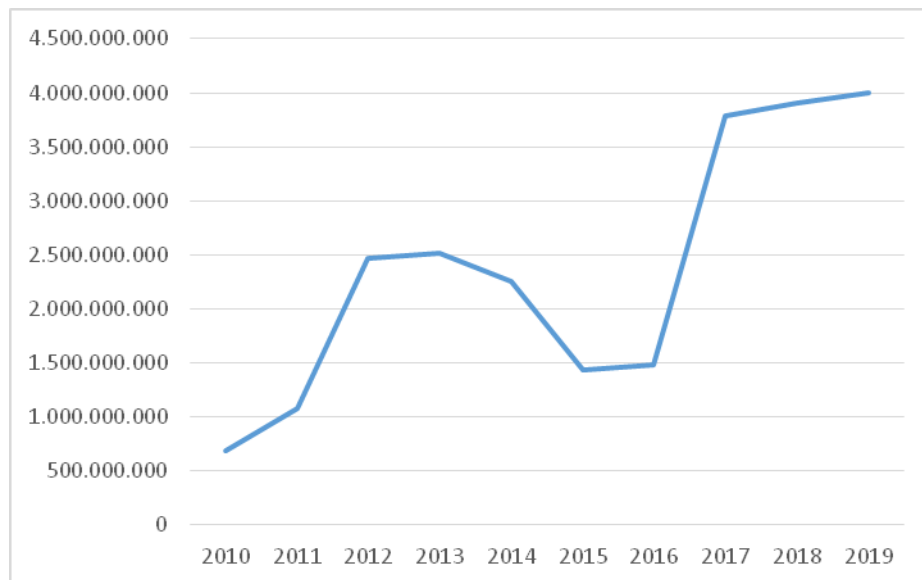
<b>PRACE Call</b>	<b>Resources offered (in core hours)</b>	<b>Start of allocation</b>
EA Call	324.000.000	2010
1 <sup>st</sup> Call	360.000.000	2010
2 <sup>nd</sup> Call	400.000.000	2011
3 <sup>rd</sup> Call	676.000.000	2011
4 <sup>th</sup> Call	1.136.000.000	2012
5 <sup>th</sup> Call	1.336.000.000	2012
6 <sup>th</sup> Call	1.259.500.000	2013
7 <sup>th</sup> Call	1.259.500.000	2013
8 <sup>th</sup> Call	1.099.500.000	2014
9 <sup>th</sup> Call	1.154.700.000	2014
10 <sup>th</sup> Call	924.200.000	2015
11 <sup>th</sup> Call	510.200.000	2015
12 <sup>th</sup> Call	690.200.000	2016
13 <sup>th</sup> Call	785.200.000	2016
14 <sup>th</sup> Call	2.061.000.000	2017
15 <sup>th</sup> Call	1.728.000.000	2017
16 <sup>th</sup> Call	2.051.000.000	2018
17 <sup>th</sup> Call	1.849.000.000	2018
18 <sup>th</sup> Call	1.834.000.000	2019



PRACE Call	Resources offered (in core hours)	Start of allocation
19 <sup>th</sup> Call	Estimated 2Bn	2019

**Table 1: Core hours offered in each PRACE call**

The following graphic shows the offer of resources per year based on this assignment:



**Figure 1: Core hours offered by PRACE, per year**

Figure 1 clearly shows how PRACE has been increasing the provision of HPC resources for European researchers with the onset of PRACE 2. In addition, the architectures available have also improved with PRACE 2, resulting in an increase in computing capacity that is relatively larger than the observed increase in core hours. If one takes the results from the High-Performance Linpack benchmark, a measure of computing capacity that is used to rank supercomputers in the TOP500 list, Figure 2 shows how the PRACE 2 Programme has increased by a factor of four the computational capacity offered by the stable regime of the PRACE 1 Programme (2013).

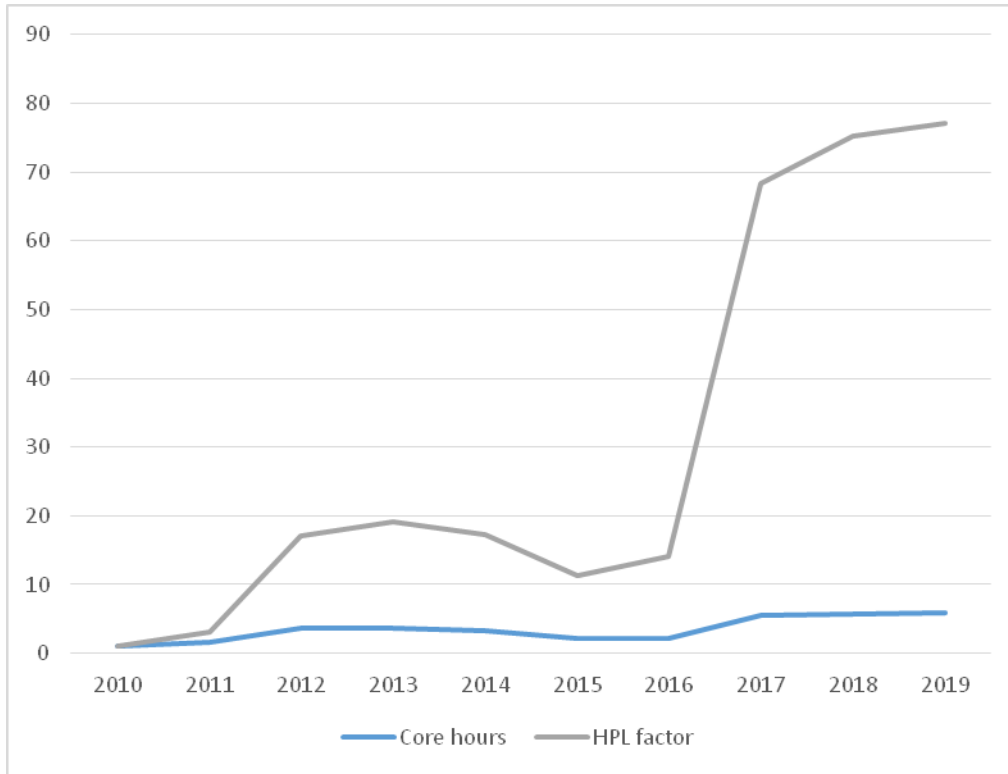


Figure 2: Fold increase of HPC computation capacity, compared to core hours, offered by PRACE

One of the principles of PRACE 2 is that all PRACE members have to contribute to the operation of the infrastructure. An underlying consequence of such principle is the monitoring of the distribution of PRACE resources amongst PRACE members, in particular for General Partners (GPs), to show the benefits of contributing to the infrastructure. The following shows the evolution of a cumulative distribution of resources allocated to HMs and GPs, including resources allocated to third countries (TCs) (Figure 3), and then specifically focused on the PRACE 2 period (Table 2).

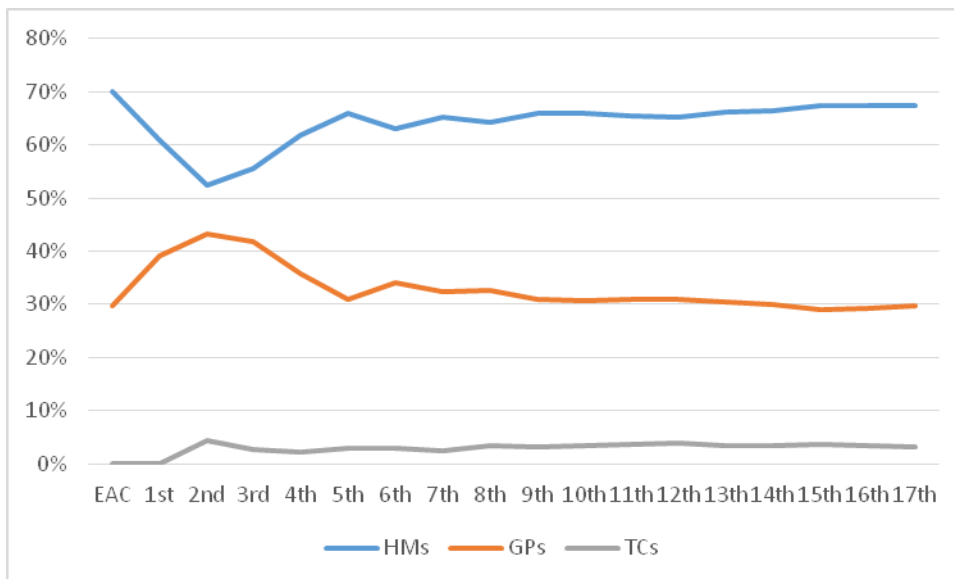


Figure 3: Cumulative distribution of PRACE allocations

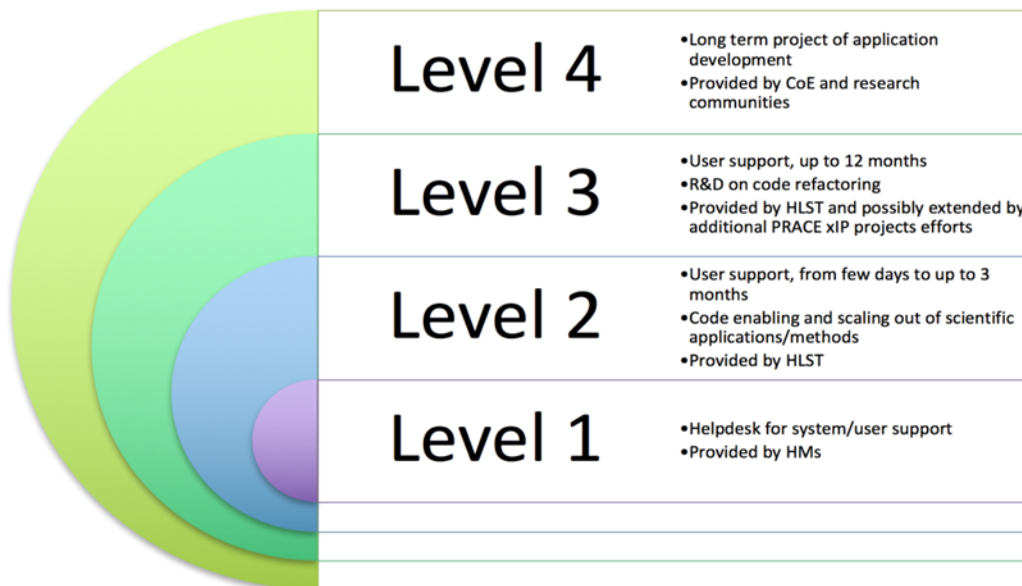
	HMs	GPs	TCs
14 <sup>th</sup> Call	69%	28%	3%
15 <sup>th</sup> Call	74%	20%	5%
16 <sup>th</sup> Call	69%	31%	-
17 <sup>th</sup> Call	66%	34%	-
Average PRACE 2	69%	29%	2%

**Table 2: Distribution of PRACE 2 resources**

After two years of running and four calls awarded, the PRACE 2 Programme has nearly converged to the overall PRACE distribution of resources between Hosting Members, General Partners and Third Countries. It is worth remembering that PRACE resources are allocated following the recommendations of its Access Committee [4], instructed to rank proposals based solely on their scientific excellence. There is no enforcement of quotas or shares amongst applicants based on their country, scientific discipline, or any other criteria.

### 2.1.2 High Level Support Teams

With the start of the PRACE 2 Programme, the selection and implementation of the High Level Support Teams (HLSTs) took place. Two HLSTs started operations in 2017 in France and Switzerland. In 2018, the German and Spanish HLSTs joined the support programme, and Italy will join in 2019. These teams have received periodic requests from the Access Committee to improve the performance of codes of general interest and specific applications of PRACE users. This has included level-2 and level-3 support activities, according to the following support scheme:



**Figure 4: Levels of HPC User Support considered by PRACE**

Since the beginning of the programme, the HLST partners have worked to improve the performance of more than 30 scientific codes, through 20 level 2 projects and 12 level 3 projects. After a reasonable ramp-up the programme is now operating smoothly in a stable process.

### 2.1.3 PRACE-6IP Forward-looking Software Solutions mini-projects selection

The PRACE-6IP Work Package 8 objective is to deliver forward-looking software solutions addressing two main challenges in the pre-exascale landscape:

- The diversity of hardware (requiring performance portability in codes)
- The software complexity (requiring separation of concerns in codes).

This WP advances strategic developments that are ‘high risk, high gain’ and potentially disruptive. The main deliverable is open source software in the form of libraries or significantly refactored codes (explicitly enabling sharing of components, or changing programming paradigm). Not only low-level algorithms, but also adaptable data layouts, which might require generic programming techniques, as are available in modern C++, are sought. The WP looks to avoid HPC-specific solutions, but instead adopting broadly supported industry standard technologies where possible.

Aiming for high quality and significant impact, a call for advanced strategic projects was open at the end of May 2018.

#### 2.1.3.1 Selection Process

The PRACE Scientific Steering Committee (SSC) has autonomously performed the ranking of the PRACE-6IP WP8 proposals based on a committee of five SSC members. The committee was led by Sinéad Ryan, the SSC Chair and further included Marina Bécoulet, Claudia Filippi, Matej Praprotnik, and Mike Payne. The full SSC was available for further consulting. The proposal submission and review were implemented on the Linklings system (managed by Tim Robinson, ETHZ), Joost VandeVondele (ETHZ) organised the process.

The SSC received 15 proposals for review. This is consolidated from the 34 letters of intent received, and reflected in the fact that most proposals are collaborations between several partners (the two largest proposals have 12 partners). In terms of ‘Central PRACE’ resources requested, the largest proposal requested 597K € of funding, the smallest 94K €. These resources are (at least) matched by partner committed resources, and in-kind resources. The total resources requested by all proposals is 4,5M € (Central) and 2,2M € (Committed).

The process closely followed the agreed protocol outlined in WP8 of the PRACE-6IP proposal. In particular, it was based on external review, with external reviewers selected by the SSC. Over 90 reviewers (on average 6 per proposal) had to be contacted to have appropriate coverage of the proposals (41 completed reviews). Reviewers were asked to grade the scope (4 aspects), the approach (4 aspects), the team and management (3 aspects) on a scale from 1 to 5 (5 being the highest rating), as well as to make a funding recommendation (fund, maybe fund, do not fund). A final average grade was obtained using the agreed weighting. In general, there was a good agreement between the grades given, and the reviewer funding recommendation made. Nevertheless, the SSC was explicitly given the freedom to rank proposals autonomously according to their expertise, as only the committee had an overview of all proposals.

The submission and review process was conducted according to the timeline agreed to in the written consultation of the PRACE-6IP Consortium partners. In particular: the platform for proposal submission opened 30 May 2018, and closed 30 August 2018 (first submission on 28 August 2018), proposals were sent for review from 13 September 2018, review deadline (extended) 1 November 2018, SSC ranking meeting 15 November 2018, PRACE-6IP Consortium meeting for the funding decision on 11 December 2018.

### 2.1.3.2 Ranking and funding recommendations

The SSC has discussed the proposals at the ranking meeting in depth, and has unanimously come to a decision in the ranking, and funding recommendation. The SSC has:

- Identified seven out of 15 proposals (47%) to be very strong, having ambitious plans with clear ideas on the implementation, with relevance to the exascale roadmap, and good connection to the user community. These proposals also have the highest rating in external review (4.0 and higher) and SSC recommends funding:
  - *Modernisation of Plasma Physics Simulation Codes for Heterogeneous Exascale Architectures* (PI: Louhivuori, Martti)
  - *Linear Algebra, Krylov-subspace methods, and multi-grid solvers for the discovery of New Physics* (PI: Alexandrou, Constantia)
  - *NB-LIB: Performance portable library for N-body force calculations at the exascale* (PI: Laure, Erwin)
  - *Performance Portable Communication Layer for Grid Applications* (PI: Bianco, Mauro)
  - *Performance Portable Linear Algebra* (PI: Solcà, Raffaele)
  - *LoSync - Synchronisation reducing programming techniques and runtime support* (PI: Bull, Mark)
  - *Particle kinetic codes for Exascale plasma simulation* (PI: Gibbon, Paul).
- Identified two out of 15 proposals (13%) that are weaker in some aspects, but might be funded if reviewer comments are taken appropriately into account. The SSC suggests to have a resubmission of these proposals, possibly as part of a later call. These are proposals:
  - *115 FEM/BEM based domain decomposition solvers* (PI: Merta, Michael) and *113 Optimizing scientific software on ARM architecture* (Meyer, Norbert). In particular, proposal 115 is ambitious but misses technical detail on the implementation, and could improve its connection to the application domain; proposal 113 insufficiently references other work available, and might duplicate efforts. Care needs to be taken that this addresses ARM architectures that are relevant for the exascale roadmap;
- Identified six out of 15 proposals (40%) that should not be funded in their current form. These are proposals:
  - *Machine Learning for Scheduling Task Pipelines (Old title: Machine learning in HPC environment)* (PI: Böhm, Stanislav)
  - *Towards an open-source Exascale code for computational cosmology* (PI: Hammer Nicolay)
  - *A Fast Versatile Ocean Simulator (Veros) in Python* (PI: Kristensen, Mads)
  - *PaMMs: Parallel Mesh Manipulation Suite* (PI: Borrell, Pol)
  - *Parallel Molecular Docking Software* (PI: Tekin, Adem)

- *Scalable Density Functional Theory on FPGAs* (PI: Aykanat, Cevdet).

These proposals were considered as having insufficient impact on exascale, to be limited to specific codes, to lack a supporting community, to lack coherency and sufficient detail, or generally considered insufficiently strong.

### 2.1.3.3 Recommendation on resource allocation

The SSC suggests that the seven strongest proposals should be funded at the requested resource level. It is understood that this does not fully exhaust the available resources. The SSC therefore recommends that a second call for proposals is organised, where resubmissions and new proposals can compete for these remaining resources. Such a competitive second stage will yield additional high quality proposals, and will lead to the most effective use of resources.

### 2.1.3.4 Final decisions

Following these recommendations, on 11 December 2018, the PRACE-6IP Consortium approved the ranking and funding recommendation by the PRACE SSC.

Additionally, it was agreed by the PRACE-6IP Consortium that the proposals 115 (Merta, Michael) and 113 (Meyer, Norbert) need to revise their proposals taking only (not changing partners or budget) the reviewers' comments into account and submit them to SSC for a final check by 18 January 2019. The proposals will be considered to be approved if recommended by SSC. And furthermore, PRACE-6IP Consortium approved a second call for 'Forward-looking Software Solutions' for beginning of 2019 for 2-4 additional projects.

All the above decisions were communicated to proposal applicants shortly after the PRACE-6IP Consortium meeting.

## 2.2 Relation PRACE – EuroHPC

### 2.2.1 The EuroHPC initiative

EuroHPC is a European Commission (EC) initiative that addresses two important issues in the European HPC ecosystem. First, the most performant supercomputers are not based in the EU [5] and, second, supercomputers based in the EU depend on non-European technology. Furthermore, according to the EC [6] the supply of computation time cannot satisfy growing demand, resulting in scientists and industry processing their data outside the EU, with the serious consequences to privacy, data protection, commercial trade secrets and ownership of data. Europe is also underinvesting in HPC with a funding gap of 500-750 million Euro per year.

The EuroHPC initiative was launched in Rome on 23 March 2017, when Ministers from seven European countries (France, Germany, Italy, Luxembourg, Netherlands, Portugal and Spain) signed the declaration to support the next generation of computing and data infrastructures [7].

The objectives of EuroHPC are to procure and deploy in Europe world-class petascale and pre-exascale HPC infrastructures, in a competitive timeframe. Furthermore, this infrastructure will be made available to public and private users for developing leading scientific and industrial applications that would foster the development of a broad pre-exascale ecosystem in Europe. In this way, the timely development of the next generation of European HPC technologies and their

integration into exascale systems will be supported. According to the EC, the EU will rank among the world's top supercomputing powers by realising exascale supercomputers, ideally based on competitive EU technologies, around 2022 [6].

The selected legal instrument to achieve the aforementioned objectives is the Joint Undertaking (JU), as it is the only instrument at the European Union level to effectively and efficiently combine joint procurement and ownership of supercomputers, as well as joint investment in the development of technology for the procured machines [8].

The EuroHPC JU foresees the initial co-investment with Member States of about 1 billion Euro, out of which 486 million Euro come from the actions already planned by the Commission in Horizon 2020 and Connecting Europe Facility (CEF) programmes in the current Multiannual Financial Framework (MFF). An additional ~422 million Euro will be contributed by private or industrial players in the form of in-kind contributions to the JU activities [9].

The Council Regulation (EU) 2018/1488 of 28 September 2018 establishing the European High-Performance Computing Joint Undertaking has been published in the Official Journal of the European Union on the 8 October 2018 [10].

PRACE is mentioned in the following two points in the EuroHPC JU Regulation:

- a) In recital No 18 of the preamble where it is stated "[...] The Joint Undertaking may cooperate with PRACE for providing and managing access to a federated and interconnected supercomputing and data infrastructure and its services, as well as for training facilities and skills development opportunities", and
- b) In Article 3, par. 3 "The Joint Undertaking shall have the following specific objectives:" subparagraph (i), where it is stated "[...] to interconnect and federate regional, national and European High Performance Computing supercomputers and other computing systems, data centres and associated software and applications in cooperation with PRACE and GÉANT;"

On 12 December 2018, the 32<sup>nd</sup> PRACE Council approved and subsequently published the "PRACE in the EuroHPC Era" Position Paper [11]. The document advocates for strong partnership between EuroHPC and PRACE, including key partners from the European ICT landscape. Besides the presentation of the currently running PRACE and future services, the paper also analyses the complementary missions of EuroHPC, acting as a high level financing agency (top down activity), and PRACE, a science driven infrastructure (bottom up activity). The particular document serves as the primary source of information for the relation between EuroHPC and PRACE.

Meanwhile, a letter jointly addressed by the German (BMBF) and French (MESRI) Research Ministries to the PRACE Council Chair, encourages PRACE to find its place in the new landscape created by the EuroHPC JU. In this letter, PRACE is urged to work closely with the JU and some elements deemed important are listed.

### *2.2.2 Offer of PRACE services*

PRACE is able to offer the following well-established services in its working relationship with EuroHPC.

#### **Peer review of HPC projects**

PRACE has been running a recognised, world-class peer review of applications solely based on scientific excellence.

In the same way as PRACE has been carrying out peer review of HPC projects for access to PRACE Tier-0 systems, PRACE can continue with this process, for the access to EuroHPC as well as PRACE Tier-0 systems in a transparent, seamless manner to the users.

### **Training the next generation of HPC users**

PRACE has established an extensive Training programme, with more than 100 training events taking place throughout Europe through its PRACE Training Centre network, and the series of seasonal schools and on-demand events that it hosts. During the past 10 years, since 2008, PRACE has hosted more than 500 events, training more than 11500 participants.

Due to its success and outreach, PRACE can coordinate the European training in HPC.

PRACE will continue to provide training to the next generation of European HPC users, by continuing and expanding its training programme.

It will also aid and coordinate the training activities of EuroHPC Competence Centres and Centres of Excellence (CoEs).

### **Maintain the operation of the European-wide Tier-0 and Tier-1 HPC infrastructure**

PRACE WP6 has worked hard and integrated the PRACE European Tier-0 and Tier-1 systems. These systems have a common working environment and are connected by a high speed network so users can use any system and switch between systems without much disruption to their working process, especially with regards to the transfer of their scientific data.

The success of the PRACE European HPC infrastructure has been due to the consortium of system administrators from all around Europe who have been able to collectively evaluate, discuss and decide on the best tools and services to use, so as to maintain the security, availability and serviceability of the HPC systems to the European HPC user community.

PRACE can allow for EuroHPC systems to join its supercomputing infrastructure, so that users can easily move and migrate from PRACE to EuroHPC systems.

This process will be aided by the possibility that EuroHPC systems will be hosted at sites where PRACE systems are already hosted.

### **Application enabling and support activities**

Over the PRACE-IP projects, WP7 has carried out application enabling activities and has supported users and industry through preparatory access and PRACE SME HPC Adoption Programme in Europe (SHAPE). Most of these activities have been outside the scope of the CoEs and perhaps the future EuroHPC calls.

WP7 application enabling activities can continue in a similar manner as they have been in previous PRACE-IP projects – to support communities not represented by CoEs.

Furthermore, PRACE can work together with EuroHPC and CoEs and coordinate calls and activities to prevent duplication of work and to fill the gap between them.

### **Dissemination activities**



The successful PRACE Communications and Dissemination team can coordinate with EuroHPC and EuroHPC Competence Centres for the communication of EuroHPC and PRACE activities and successes to various audiences in the European and global community and population.

### 2.2.3 HPC Competence Centres

Within the EuroHPC initiative the EC seeks to establish HPC Competence Centres (HPCCC) in Member States (MS), which would be associated with national supercomputing centres. Although it is still a work in progress, the main idea behind these centres is that they should not only provide HPC services in general, but also be a single point of contact for HPC competences in each country. In particular, they would provide [12]:

- On demand services and tools to users
- Access to the HPC innovation ecosystem, and access to the HPC innovation ecosystem, and the supercomputers
- Access to skilled technical experts
- Training and outreach
- Networking and coordination with other competence centres

Another very important aspect is that HPCCCs should collaborate closely with Small and Medium Enterprises (SMEs) in order to increase the adoption of HPC by these companies. This would involve training or in general consultancy by HPC experts as well as access to the supercomputing infrastructure. HPCCCs are an important component of the overall Digital Europe Programme launched by the Commission in June 2018 [13] for the next Framework Programme. In particular, they are seen as strongly interacting with other pillars of this programme, namely the Digital Innovation Hubs and the Cybersecurity Competence Network.

The Commission, through DGConnect, is planning to launch a call during 2019 for proposals to establish HPCCCs in MS which would include financing. The exact terms are still being worked out at this time (January 2019). DGConnect has established a working group to advice on the scope of HPCCCs which includes people from several PRACE partners.

As far as the relationship with PRACE is concerned, the HPCCC programme would present further opportunities for combining and optimising the respective roles within the HPC European ecosystem.

### 3 Legal Support to PRACE Infrastructure

In addition to the support mentioned in previous sections of this deliverable, the PRACE-5IP WP2 working group has provided direct legal support to PRACE aisbl on several topics of current relevance and to issues of a legal nature that arose in the different work packages of the PRACE-5IP project.

#### 3.1 Data Protection

After the new EC Regulation on Data Protection [14] came into force on the 25 May 2018 the planned actions - the centralisation of the handling of data by defining PRACE aisbl as the Data Controller of all the collected data during the PRACE-IP projects by the other PRACE Partners that will act in this case as the Data Processors - were put into place, including the ones described below:

##### 3.1.1 PRACE aisbl as data controller

The new role of PRACE aisbl as Data Controller, in accordance with the PRACE-5IP Management Board decision from 15 December 2017, has been implemented with the assistance of WP2 through different measures including an inventory of personal data sources, further development of internal policies and signature of related Data Processing agreements with PRACE-5IP Partners acting as Data Processors.

##### 3.1.2 Data Processing Agreements: comments and incidents

The signature process of these Data Processing agreements was launched at the end of April 2018. The negotiation phase took longer than expected. The main reason for this was the fact that the counterparties were also getting adapted to the new legal requirements themselves. To date, a majority of PRACE-5IP Partners have signed the Data Processing Agreement as Data Processors.

Among the questions which raised some discussion the following are the most relevant:

- Confidentiality of the Agreement: this requirement was considered as too strict so therefore it was softened when required;
- IPRs: it was considered to be accessory and not essential to be included in the mentioned Agreement;
- Extension of the sub-processing: this was clarified as some Partners were subject to public procurement and therefore they considered the clause on this aspect was too strict;
- Minimum appropriate technical and organisational security measures: this was one of the trickiest points as there was no clarity about the extent of these measures. Therefore each Partner had to check to what extent it could commit to comply with those, and when necessary, to adapt them;
- Delay to inform about incident or data breach: this delay was not specified and therefore some Partners proposed an alternative formulation;

- Audit rights: it was clarified and sometimes nuanced the extent of the right of PRACE aisbl as Data Controller to assess the compliance by the relevant Data Processor of the signed Agreement, including the cost of such audit;
- Liability: the scope of the liability of each Party in case of damages caused by the infringement of the Agreement was also discussed with some Partners. In some cases just a clarification was needed and in a few cases an adjustment was agreed;
- Exclusion of terms of the Data Processor: it was necessary to clarify the meaning and extent of this exclusion as being limited to the subject matter of the Agreement;
- Terminology: some concepts like purposes of the Processing, categories of Data Subjects and type of Personal Data were not totally clear for all Partners and therefore some clarification was provided when needed.

### 3.1.3 GDPR analysis for Tier-0

The objective of the PRACE Tier-0 Peer Review Process is to manage the PRACE Project Access calls, starting with the preparation and opening of the call continuing up until the final recommendation of projects to be awarded HPC resources by the PRACE Hosting Members. The following is a review of the process from the point of view of usage of personal data.

Personal data used in this process can be classified in three independent categories, which will be analysed separately. For the purposes of this analysis, a proposal to PRACE Project Access consists of a collection of personal data, a research project and a request to an HPC resource hosted by PRACE Hosting Members.

#### A. Personal data of the actors involved in the process

This consists of the contact details (full name, e-mail, phone number, skype contact and working institution) of the actors involved in the process. In detail:

- a. Managing director and BoD member(s) in charge of the peer review;
- b. Peer Review Officers and other PRACE aisbl staff;
- c. PRACE Council delegates and advisors;
- d. Staff appointed by PRACE Hosting Members to contribute as technical advisors;
- e. Members of PRACE Scientific Steering Committee;
- f. Members of PRACE Industrial Advisory Committee;
- g. Members of PRACE Access Committee.

The personal data collected:

- Is received at the start of the appointment of the individual;
- Is stored in PRACE aisbl premises;
- Is accessed only by PRACE aisbl staff, PRACE Managing Director and PRACE BoD member(s) in charge of the peer review;
- Is used strictly to exchange information relevant to the process with each actor;
- Is kept indefinitely for traceability purposes;
- Is not shared with any other third parties.

### B. Personal data from external scientific reviewers

This consists of the contact details (full name, e-mail, phone number, bank account details and working institution) of the pool of external scientific reviewers.

The personal data collected:

- Is received at the start of the appointment of the individual;
- Is stored in PRACE aisbl premises;
- Is accessed only by PRACE aisbl staff, PRACE Managing Director and PRACE BoD member(s) in charge of the peer review;
- Is shared with PRACE Access Committee members, in order to carry out the selection of reviewers for proposals. This data does not need to be kept by the Access Committee once the selection has been finalised;
- Is kept indefinitely for traceability purposes;
- May be partly shared (full name, e-mail, phone number and working institution) with other funding programmes related to PRACE activities, after the necessary agreements are established.

### C. Personal data from applicants to PRACE Project Access calls

This consists of the contact details (full name, gender, e-mail, working institution and working country) of the applicants to PRACE Project Access calls. This includes the Principal Investigators and other researchers declared as Collaborators by the Principal Investigators.

The personal data collected:

- Is received during the submission of proposals to PRACE Project Access calls;
- Is stored in PRACE aisbl premises;
- Is used strictly:
  - to exchange information relevant to the process with the actors listed in the previous category, according to their specific role in the process;
  - to report to PRACE Council delegates;
  - to report on PRACE website about Project Access awards;
  - to produce additional anonymised statistics and reports;
- Is kept indefinitely for traceability purposes;
- Is not shared with any other third parties than those described here.

The following is an analysis of the actors of the process in relation with the usage and flow of personal data:

- PRACE aisbl
  - The personal data received through proposals is managed by PRACE Peer Review Officers. PRACE Managing Director and PRACE BoD member(s) in charge of the peer review have also access to this data. PRACE Communications Officers may access the personal data for dissemination purposes;
  - Any of these actors may contact the PI and/or the Collaborators of the proposals.
- Technical Advisors

- The personal data is distributed to the technical advisors through the proposals. Each advisor receives only those proposals assigned to her/him. Assignment of proposals is automatic and based on the HPC resources requested in the proposal;
- Technical advisors review the proposals and may contact the PIs or the Collaborators for clarification purposes;
- Technical advisors may keep the data received for traceability.
- Access Committee
  - The personal data is distributed to each Access Committee member through the proposals;
  - The Access Committee reviews the proposals in order to:
    - assign scientific reviewers;
    - rank the proposals according to scientific excellence;
  - The Access Committee shall not use the personal data to contact the PIs or the Collaborators;
  - The Access Committee does not need to keep the proposals received after the end of the relevant PRACE Project Access call.
- External Scientific Reviewers
  - The personal data is distributed to the external Scientific Reviewers through the proposals. Each reviewer receives only those proposals assigned to her/him;
  - Scientific reviewers provide a ranking to the proposals assigned;
  - Scientific reviewers are instructed not to use the personal data to contact the PIs or the Collaborators of the proposals assigned;
  - Scientific reviewers do not need to keep the proposals received after the delivery of their assignment.
- Award results
  - Each awarded proposal and the personal data contained is distributed to the PRACE Council Delegate and Advisor of the Hosting Member providing resources to the proposal, and to the technical advisors of the centre contributing such resources;
  - These actors use the personal data received to manage the access to the HPC resources awarded and for statistical purposes, including regular contact with the PI and Collaborators listed in the proposals;
  - These actors may keep the data received for traceability.
- Disputes and appeals
  - In the case of disputes and appeals, proposals and the personal data contained there may be shared with the chair of PRACE SSC and/or chair of PRACE Industrial Advisory Committee (IAC) as relevant. They may decide to share the proposals with other members of their committees. In specific cases, it may be necessary to share the proposals with external scientific reviewers;
  - Proposals shared do not need to be kept after the dispute or appeal has been resolved.

The present analysis shows the complexity of the personal data flows in the Tier-0 HPC programme. This analysis will be followed up with the implementation of the necessary agreements between the parties involved, if not yet in place, to assure compliance with the GDPR requirements.

### 3.1.4 *GDPR analysis for DECI*

The DECI Tier-1 resource exchange programme follows, as much as possible, the same process as described in the previous section for PRACE Project Access. There are some simplifications (for example, scientific reviewers are not paid so no bank details are required) and some additional complications (the DECI programme is run via the Optional Programme rather than directly via PRACE-5IP or the PRACE aisbl). However, for the recent opening of the DECI-15 call we were able to put in place the necessary infrastructure within the submission system to be compliant with GDPR legislation. As with PRACE Project Access, the PRACE aisbl was made Data Controller with all of the PRACE partners being recipients of data. In the case of DECI, a 10-year retention period was set. WP2 is working together with the BoD and the legal adviser Bird and Bird LLP to ensure that any future agreements and documents, where appropriate, cover DECI as well as PRACE Project Access. Note that when PRACE-6IP starts, DECI will become part of the WP7 (Applications Enabling and Support) activity which simplifies matters.

## 3.2 **Support to WP3**

### 3.2.1 *PRACE Website compliance with GDPR*

The PRACE website was updated in order to be compliant with GDPR, with its Legal Notice and Cookies Policy being adapted to the new legal requirements.

The Legal Notice changed into the new PRACE Data Protection Policy is available on the PRACE website under the following link:

- <http://www.prace-ri.eu/IMG/pdf/PRACEGDPRDataProtectionPolicy201804.pdf>

The PRACE Web Team also carried out an analysis of the cookies used by the PRACE website. The PRACE Cookie Policy was then updated, listing of all of these cookies, their category, a short description of each and their duration. The new Cookie Policy can be found at the following link:

- <http://www.prace-ri.eu/cookie-policy/>

And clearly explains to users of the PRACE website, why cookies are used, and how they can disable these should they wish to do so.

#### 3.2.1.1 *PRACE Mailing lists*

The PRACE database management system (MailerLite) was maintained and we implemented the relative actions for it to be GDPR compliant. To achieve this, a new Data Privacy Policy was created and made available on the PRACE website. These can be found under the following links:

- PRACE Privacy Notice

<http://www.prace-ri.eu/IMG/pdf/PRACEGDPRPrivacyNotice201804.pdf>

The following page was set up, which clearly identifies the various mailing lists contacts could sign up to, and what they will be receiving when they do this:

- <http://www.prace-ri.eu/subscribe-to-prace-gdpr-compliance/>

Contacts that were stored in the database were then contacted to re-subscribe to the PRACE mailing lists of their interest and to comply with these new policies. This subscription was carried out through email confirmation, thus ensuring that we received the explicit consent of contact to store their data.

### 3.3 Support to WP4

#### 3.3.1 Event Page

For the PRACE Indico Events website, in order to make it GDPR compliant, similar processes to what were carried out for the PRACE website were implemented. These include:

- Addition of a link to the PRACE Legal Notice. This refers to the following document (mentioned in the previous section):

<http://www.prace-ri.eu/IMG/pdf/PRACEGDPRDataProtectionPolicy201804.pdf>

- Analysis of the cookies used by the PRACE Indico Events website. This analysis has been carried out and a Cookie Policy was created, listing cookies used by the website, their category, a short description of each and their duration. The Cookie Policy clearly explains to users of the PRACE Indico Events website, why cookies are used, and how they can disable these should they wish to do so.

As the Events website allows for registration of PRACE Training events, and as this requires the storing of personal data the following will also have to be carried out:

- A new Data Privacy Policy, specific for the PRACE Events website and relative to KIFÜ (the partner hosting this service) will have to be created.
- The current implementation of the PRACE Training Mailing list subscription on the events website will have to be changed. At the moment, in the registration form, there is a simple radio button where users are asked if they would like to receive future PRACE Training related emails. As this does not conform to GDPR, it will be removed, directing them to the following GDPR compliant website and process (described in a previous section) where they can subscribe:

<http://www.prace-ri.eu/subscribe-to-prace-gdpr-compliance/>

- The registration form, and specifically the section of the form which refers to Personal data will need to include links to the PRACE Legal Notice (Data Protection Policy) and the new Data Privacy Policy to be created (described in the first bullet).

#### 3.3.2 Future Learn Contract – negotiation new contract

During the PRACE-4IP project, the training team of WP4 developed two Massive Open Online Courses (MOOC) pilots - “Supercomputing” and “Managing Big Data with R and Hadoop” – as a new training method hosted on the FutureLearn platform [15]. In addition, during PRACE-5IP project further MOOCs have been developed.

The contract with FutureLearn, the provider of the online platform for the training was signed and made effective on 15 July 2016 and it was renewed automatically twice for 1 additional year each time, being currently renewed until 15 July 2019.

Based on the conditions of this contract, each developed MOOC is free and offered twice a year with constant improvements by each MOOC team. The MOOCs last 5 weeks and the learners have two additional weeks to finish the course, therefore the courses and the material are freely available for 7 weeks.

During the enforcement of the contract so far, the main aspect considered problematic is the limitation in time of the freely available PRACE educational material on the FutureLearn platform. This condition, included in the initial contract with FutureLearn, was not in consensus anymore with the internal policies of FutureLearn provider that have been changed shortly after the contract was signed. According to the service contract the termination may be triggered by a 90 days' notice to the other Party. This means that the renewal terms need to be negotiated and agreed at the latest by 15 April 2019 if either any change needs to be introduced or the service with the mentioned provider is terminated.

At the moment, WP2 and WP4 representatives initiated discussions with the FutureLearn lawyers in order to renew the terms of the contract and make the PRACE educational material freely available without any limitation in time.

### 3.3.3 *Summer of HPC analysis*

One of the training activities of the PRACE-4IP and PRACE-5IP projects is the Summer of HPC programme (SoHPC) [16]. Over a number of years, this has grown to be a successful activity, highly valued by late stage undergraduates and early stage postgraduate students in HPC disciplines. This programme is open to approximately 20 international students per year; it starts with a common training week covering general HPC topics, followed by two-month placements of the students at the different host sites (PRACE partners) for specific training in HPC.

In light of this success, WP2 proposed that PRACE aisbl initiates a mobility programme for students in HPC, in order to enhance the capacity of the current activity in the project. The objective of this mobility programme would be to award mobility fellowships to the SoHPC students, under similar conditions of Marie Curie Sklodowska Actions. This would include travel costs, accommodation costs and an allowance to cover living costs during the two months of placement.

This PRACE Mobility Programme for Students in HPC would rely on the SoHPC organisation team (to be kept as part of the PRACE-6IP activity) to provide a ranking of the candidates to benefit from the mobility fellowships. PRACE aisbl would take this ranking and award the mobility fellowships until the available budget is consumed.

WP2 from PRACE-5IP has analysed the legal framework for this new programme with Bird & Bird LLP, and the conclusion is that this mobility programme falls properly within the corporate scope of PRACE aisbl, as it would not challenge the non-profit scope of the organisation, and would not be considered a payment for services (hence no taxes applied).



After this positive analysis, the BoD has decided to approve the principles of the programme and has started to elaborate the Terms of Reference. Once the terms of reference have been finalised and the budget is approved, PRACE aisbl will adopt this new mobility programme.

### 3.4 Parental leave and other career breaks

In the frame of PRACE Project Access Calls, there was a case that brought the attention to the potential impact of a parental leave (and in general to any professional career break, like sick leaves) during the allocation period of an awarded project, and in general to any professional career break.

Given the nature of HPC resources, PRACE awards have a strong limitation regarding the time of usage of resources (fixed allocation period), and hence any situation that prevents a research group to use the complete award within the allocation period has a potential strong impact in the outcome of their research project.

The WP2 team has analysed the case from different perspectives, detailed as follows: general regulations from EU, examples from other funding schemes, and examples from other programmes. This analysis has led to the preparation of a proposal for a “Code of Conduct” for PRACE.

#### 3.4.1 *Legal regulations and practices from other funding programmes and schemes*

The legal analysis has taken as a reference the case of “public grants”, in particular looking at the existence of applicable legislation or code of conducts, including the good practices of other infrastructures or similar entities.

The legal analysis concluded that there are European Directives which refer to this topic tangentially in terms of no discrimination, although they were not addressing access to “public grants” as such:

- Directive 2004/113/EC of 13 December 2004 implementing the principle of equal treatment between women and men in the access to and supply of goods and services [17];
- Directive 2006/54/EC of 5 July 2006 on the implementation of the principle of equal opportunities and equal treatment of men and women in matters of employment and occupation [18];
- Directive 2010/41/EC of 7 July 2010 laying down objectives for the application of the principle of equal treatment between men and women engaged in an activity, including agriculture, in a self-employed capacity, and on the protection of self-employed women during pregnancy and motherhood [19].

The mentioned Directives lay down principles for national legislations (referring to standard economic activities) but there is at present no specific EC Regulation which would be directly applicable to the relevant awarded access to the infrastructure as such.

Another perspective which was explored was the one of the Public Procurement. In this regard the Directive on public procurement 2014/24/EU establishes the principles of non-discrimination and equal treatment in the award of public contracts [20].

Finally, the existence of guidelines from the European Commission was assessed. A website on gender equality was found containing strategies and reports [21].

Moreover, the good practices of similar entities were analysed, and it was discovered that:

- The European Research Council (ERC) has a gender equality plan which has been developed voluntarily [22].
- The Italian PhD programme regulations has a specific regulation on parental leave derived directly from the National rules in terms of maternity and paternity leave. To this a specific mentioning is made to the fact that the research project of the person in leave will be suspended and the deadline for the thesis discussed moved forward accordingly [23].

Such plan will be presented in more detailed in the next sections.

### 3.4.2 *Examples from other programmes*

After the legal analysis, we have also consulted our partners, who are managing similar HPC programmes at the national level. None of them have any policy in place to deal with the situation of temporary leave of the PI of an award.

For the Italian programme for the award of national HPC projects (ISCRA), again even if lacking any written regulation, cases have been reported of awarded researchers requesting absence for maternity leave. The researchers, in all cases, have been granted an extension of the allocation period of the HPC resources for an amount of time that has been agreed on a case by case basis.

Another partner reported a similar situation. In that case an *ad hoc* solution was adopted, which consisted in moving the award to the resources of the next call. This was only possible because the corresponding programme incorporates a reserve list, and the resources could be easily relocated.

Another example of sensibility to career breaks can be found in the ERC programme. Application to ERC grants has a strong requirement based on the stage of the professional career of researchers (years since defense of the PhD). In cases where the applicants have experienced a career break, the deadlines are adjusted according to the duration of this. Specific examples of career breaks given by ERC are maternal and paternal leaves, long-term illnesses and obligatory military service, among others.

### 3.4.3 *Recommendations and Code of Conduct for PRACE*

PRACE Project Access awards are large-scale projects typically run by a research team or a consortium of research teams, rarely by a single researcher. Hence, the potential of individual career breaks to affect the normal development of a PRACE award are relatively low. Nevertheless, there are cases where the Principal Investigator is an important key element of a project, and hence WP2 proposes to have a Code of Conduct in this regard, that follows the legal analysis performed, specifically regarding gender equality and no-discrimination.

This code of conduct would apply to any career break situation including, but not limited to, parental leaves, medical leaves, and unforeseen military obligations, among others.

Applicants are kindly requested to inform PRACE of any situation that may prevent them to benefit from the awards during the allocation period, including a tentative duration of the impediment.

PRACE will treat this information with the needed confidentiality. Impediments can be classified according to their expected duration:

- *Up to three months:* it is likely that the hosting site can accommodate and provide the same amount of resources in the reduced allocation time. Suitability of the solution needs to be confirmed by both the applicant and the site administrator;
- *From three to six months:* it is unlikely that the hosting site can provide the complete allocation in such reduced time. Nevertheless, both the site and the applicant may agree on an alternative plan for the awarded project, e.g.: extension of the allocation period, among other options. Whenever this plan affects the scope of the original project, this will need to be reassessed by the Access Committee;
- *More than six months:* Such impediment represents more than half of the allocation period, and therefore the application needs to be moved to the next call for projects according to the mechanism described in the next paragraph.

For impediments that cannot be accommodated, depending on the stage when the impeding situation is informed, the following actions are proposed:

- *After submission, and before evaluation:* the proposal is removed from the evaluation process and automatically moved to the next Project Access call. The PI will have the opportunity to amend the proposal during this period;
- *After scientific and technical evaluation:* the PI will be given the opportunity to move the proposal automatically to the next call, unaltered and keeping the scores received from the technical and scientific evaluators. Alternatively, the PI may decide to amend the proposal and have it evaluated again in the next call;
- *During the allocation period:* The project will be terminated, and relocation of the unused resources to a different project will be considered. The PI will be given the opportunity to present the status of the project to the Access Committee, who will decide if the project can continue with resources from the next call.

The following measures are proposed to relocate the corresponding unused resources:

- It is proposed that the allocation process should include a reserve list of up to 5 projects and up to 10% of the resources of the call. Projects from this list can be called for allocation up to three months after the start of the allocation period;
- If the impediment is informed from three months to six months, then the proportional fraction of the unused resources corresponding to the last six months of allocation will be moved to the offer of resources of the next call. The hosting site will have to confirm if such resources can be used along the full next allocation period, or only during a reduced period, not shorter than six months;
- If the impediment is informed after six months after the start of the allocation period, the Board of Directors together with the Access Committee will consider case by case the best options to relocate the unused resources, if possible.

### 3.5 New legal advisor for the PRACE-6IP project and PRACE RI

During the last few months, PRACE-5IP PMO prepared together with a team of experts from WP2 a new European Tender for a legal advisor for the PRACE-6IP project and the RI (please see Annex 1). From a procurement perspective, the tender needed to be renewed after several years since the current legal advisor was selected. In addition to the legal need to open a new tender, it was suggested to create some lots within tender in order to be able to choose more than one advisor for different fields.

After the consultation of the experts group it was decided that this new European Tender should contain five lots addressing the following different fields of legal advice:

- Fiscal Law
- Trade Law / NICT
- Corporate Law
- Competition Law / Public Law
- Social Law

The introduction of different aspects within the tender will allow choosing different advisors for the different fields. The experts group that will be responsible for the evaluation of the received proposals is composed so far by Eduard Brunel (GENCI), Inigo Yenes (PRACE aisbl), Eugene Griffiths (BSC), Debora Testi (CINECA), and representatives of the legal and procurement department in JUELICH, together with the PRACE-5IP PMO.

The tender was published on 18 February 2019 and the new legal advisor(s) will be defined by the end of May 2019. A face-to-face meeting with the bidding firms is foreseen at the beginning of May 2019.

## 4 Trans-National Access in PRACE

### 4.1 Introduction

The EC has different funding mechanisms for the access to research infrastructures in general, and HPC resources in particular. One of them is the Trans-National Access (TNA) mechanism, for infrastructures offering access to their services to researchers across Europe. Under certain conditions, the operational cost of these services can be eligible in H2020 Research and Innovation Action (RIA) projects.

Section 4 of D2.1 [2] of this project evaluated the compliance of the current access mechanism to PRACE HPC resources with the TNA mechanism. The conclusion of that analysis is that access to PRACE resources is already compatible with the Rules for providing Trans-National Access to Research Infrastructures of H2020 (Article 16 of the Model Grant Agreement [3]). In summary, the access is trans-national by nature, and provided free of charge to users. There is an online submission system followed by a peer review process that are well established since 2010. In this process, international scientists rank the received applications with the sole criterion of scientific excellence. The whole process is fair, transparent and impartial.

To finalise the TNA exercise, in this section we will report on the Tier-0 allocations, during the PRACE-5IP project.

### 4.2 TNA to PRACE Tier-0 systems

Since the beginning of the PRACE-5IP project, four Tier-0 Project Access calls have been awarded. These calls have been managed by PRACE aisbl, and have followed the PRACE Peer Review process that was analysed in D2.1 and concluded as compliant with the requirements of Article 16 of the H2020 Grant Agreement (TNA).

	<b>14<sup>th</sup> Call</b>	<b>15<sup>th</sup> Call</b>	<b>16<sup>th</sup> Call</b>	<b>17<sup>th</sup> Call</b>
Opening of the call	10 Oct 2016	5 Apr 2017	26 Sept 2017	7 Mar 2018
Start of allocation	1 Apr 2017	2 Oct 2017	3 Apr 2018	2 Oct 2018
End of allocation	31 Mar 2018	30 Sep 2018	31 Mar 2019	1 Oct 2019
Proposals received	117	84	72	63
Proposals ranked above scientific quality threshold	81	44	45	44
Projects awarded	60	46	44	42
Resources offered	2061M	1728M	2051M	1849M
Resources requested	4280M	3809M	3254M	2676M
Resources awarded	2075M	1684M	1673M	1712M

**Table 3: Tier-0 Project Access calls during PRACE-5IP**

The following table shows the breakdown of systems contributing to each call and the resources offered by them:

	14 <sup>th</sup> Call	15 <sup>th</sup> Call	16 <sup>th</sup> Call	17 <sup>th</sup> Call
Marconi	665M	478M	636M	648M
Mare Nostrum 4	356M	475M	475M	240M
Curie / Joliot Curie	113M	156M	185M	206M
Hazel Hen	57M	57M	70M	70M
Juqueen / Jewels	350M	-	70M	70M
Super MUC	44M	44M	105M	105M
Piz Daint	476M	510M	510M	510M

**Table 4: Resources offered by PRACE HMs to PRACE 2 Calls**

The proposals competing for these resources have undergone the steps of the Peer Review process, as follows:

- *Administrative check*, for compliance with the requirements of the call and formal completeness of the proposals received;
- *Technical assessment*, for the suitability of the HPC methodology proposed and codes to be used;
- *Scientific review*, to evaluate the scientific excellence of the proposals;
- *Prioritization*, in order to rank all the proposals received;
- *Allocation of resources*, following the ranking of proposals.

The following table shows the resources allocated in each Tier-0 system:

	14 <sup>th</sup> Call	15 <sup>th</sup> Call	16 <sup>th</sup> Call	17 <sup>th</sup> Call
Marconi	678M	502M	476M	633M
Mare Nostrum 4	356M	475M	470M	254M
Curie / Joliot Curie	113M	158M	130M	213M
Hazel Hen	57M	40M	46M	67M
Juqueen / Jewels	350M	-	68M	71M
Super MUC	44M	45M	101M	110M
Piz Daint	433M	464M	382M	364M

**Table 5: Resources allocated in each Tier-0 system**

It has not been possible to analytically calculate the actual operation cost of these systems. However, an average TCO cost of 0,02 Euro per core hour is commonly accepted as a fair estimation of the cost of general-purpose HPC systems; it is also estimated that 50% of the TCO of HPC systems corresponds to operational costs. The following table summarises the operational costs of PRACE calls 14th to 17th, based on these assumptions:

	<b>14<sup>th</sup> Call</b>	<b>15<sup>th</sup> Call</b>	<b>16<sup>th</sup> Call</b>	<b>17<sup>th</sup> Call</b>
Resources awarded	2031M core hours	1684M core hours	1673M core hours	1712M core hours
Projects awarded	60	46	44	42
TCO of resources	40,6M €	33,7M €	33,5M €	34,2M €
Operational costs	20,3M €	16,8M €	16,7M €	17,1M €
Average resources awarded to one project	34M core hours	37M core hours	38M core hours	41M core hours
Average operational cost of a project	338K €	366K €	380K €	408K €

**Table 6: The operational costs of PRACE calls 14th to 17th**

Along the duration of the PRACE-5IP project, there have been four Tier-0 calls offering a total of 7,7 billion core hours. From 336 proposals received, 192 projects from 19 different countries have been awarded 7,1 billion core hours, for an estimated operational cost of 71 million Euro. The average cost of a PRACE Tier-0 project is therefore estimated to be 370.000 Euro.

## 5 Support to the DECI Process

### 5.1 Introduction

PRACE recognises the importance of a coherent pyramid of globally competitive HPC resources and services in Europe, with Tier-0 systems on the top European level, Tier-1 systems at the national level, and Tier-2 systems operated at the level of individual research institutions. The PRACE Distributed European Computing Initiative (DECI) programme provides access to Tier-1 level resources across Europe via a series of competitive calls and is currently managed via the PRACE Optional Programme (OP) with support from the PRACE aisbl.

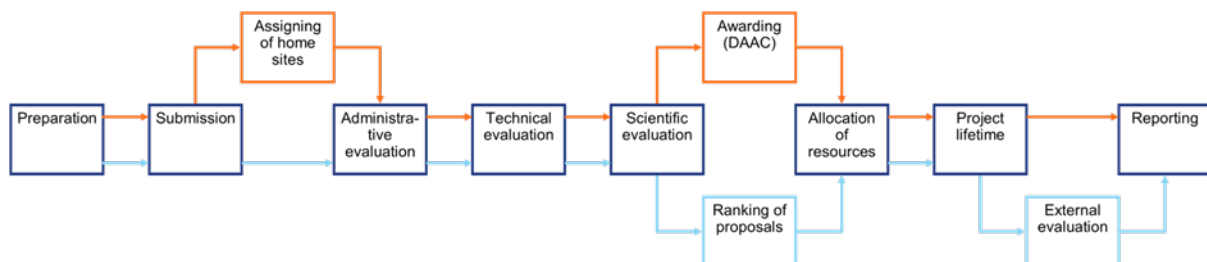
DECI is designed for projects requiring access to Tier-1 resources not currently available in the Principal Investigator's own country or for international collaborations and for projects which do not require resources on the very largest (Tier-0) European Supercomputers or very large allocations of CPU. DECI is also an important and integral part of PRACE and the European HPC ecosystem as it can act as a springboard for the careers of young researchers: through DECI they can access a larger pool of Tier-1 resources and increase the complexity of their research.

The next DECI-15 call will offer access to Tier-1 level resources of various architectures including Cray XC30/Cray XC40, Intel clusters (various processor and memory configurations) and hybrid systems (clusters with GPGPU accelerators or Xeon Phi Co-processors (KNC)), which are hosted in various European PRACE member countries.

### 5.2 DECI Proposal Submission

In Year 2 of the PRACE-5IP project, projects from DECI-14 have continued and completed their computational access. Operational support was provided to projects which needed help. This included user support carried out by local sites hosting the projects, and extension of projects beyond 12 months of computational access so projects could complete their research.

In D2.1 “Report on PRACE 2, TNA, DECI and KPIs Year 1” [2] a comparison between the DECI and PRACE Project Access submission system was made – in an effort to align the two processes towards future common tools and processes. This comparison is summarised by the following diagram:



**Figure 5: PRACE Project Access / DECI submission system**



### 5.2.1 DECI Proposal Forms and Templates

In preparation of the forthcoming DECI-15 Call, the DECI Proposal Forms and Templates were revised and made more specific. The general sections of the application form remain much the same – with only the EUDAT Call for Data Pilots section removed for DECI-15. The template detailed description document for project submission has an extra section included, requesting for a “Project plan, including workplan (e.g. Gantt chart), enabling effort required from PRACE” to be provided by applicants.

In addition, the whole DECI process and tools were analysed and processes were carried out to make them GDPR compliant.

### 5.2.2 Comparison of PRACE Project Access and DECI Proposal Forms and Templates

The PRACE Project Access proposal form contains the following sections (the data below is from Call-17) – with the bold sections identifying distinct sections which are absent from the DECI proposal form:

- General information (Type of proposal, **If proposal is a resubmission**, Project name, **Research fields - with a percentage of how much proposal matches each field, whether industry participates in the proposal**);
- Contact person for all correspondence;
- Project leader;
- Collaborators;
- Computing time requested (core hours requested on one or more Tier-0 resources);
- **For Multi-Year Access (explanation of why multi-year access is needed and approximate hours which will be required in second and/or third year of access)**;
- **Summary of the project (abstract)**;
- Computer resources requested (detailing the jobs, memory, storage, file, data transfer and I/O requirements of the project and how any challenges will be handled);
- Description of the development work on the codes;
- Routes for dissemination;
- Confidentiality;
- **Additional funding for application (collaborations applicants are engaged in)**;
- **Suggested reviewers / Excluded reviewers**

In general, the two proposal forms are quite similar despite additional sections in the PRACE Project Access proposal form that are required for more in-depth evaluation and resource allocation processes.

The PRACE Project Access template detailed description document on the other hand is somewhat longer (over 20 pages) compared to DECI's 4 pages. The sections of the former are as follows:

- 1 Key scientific/societal/technological contribution of the proposal
- 2 Detailed proposal information
  - 2.1 Justification for the importance of the scientific problem and the requested resources

- 2.2 Overview of the project
- 2.3 Validation, verification, state of the art
  - 2.3.1 Validation
  - 2.3.2 Verification
  - 2.3.3 Sensitivity analysis and uncertainty quantification
  - 2.3.4 Comparison with state of the art
- 2.4 Software and Attributes
  - 2.4.1 Software
  - 2.4.2 Particular libraries
  - 2.4.3 Parallel programming
  - 2.4.4 I/O requirements
- 2.5 Data: Management Plan, Storage, Analysis and Visualization
  - 2.5.1 Data Management Plan covering
  - 2.5.2 Project workflow
  - 2.5.3 Software workflow solution
  - 2.5.4 I/O requirements
- 2.6 Performance of Software
  - 2.6.1 Testing of your code on the requested machine
  - 2.6.2 Quantify the HPC performance of your project
- 3 Milestones (quarterly basis)
  - 3.1 Gantt Chart
  - 3.2 Communication plan
- 4 Personnel and Management Plan
- 5 Previous Allocations and Results
- 6 References

While most of the above sections are possibly relevant for DECI access applications, request for the same level of detailed description will require considerably more effort from DECI applicants. This is a situation we would like to avoid, so that DECI can act as a simpler way for European researchers to gain Tier-1 computational access for their projects.

### 5.3 Future Steps for the DECI Programme

Over the past two years, DECI has operated under the Optional Programme (OP) with support from the PRACE aisbl. In the future WP2 will provide support for the strategy of DECI and the Tier-1

programme. WP2 has identified possible actions that could be implemented in DECI towards improving the process and thus better serving academic and industrial Tier-1 users. Such actions include:

- Further aligning the DECI and PRACE Project Access application process

This can include the two processes to use the same applications tool – with the DECI process possibly using a subset of the Project Access application/review forms and the same pool of possible scientific reviewers.

- Closely aligning the opening and closing of both calls

Ideally, and if possible, we envision DECI calls to open and specifically close within a couple of weeks after the closure of Project Access calls. This will enable potential administratively rejected Project Access call applications to re-apply for the DECI call (as administrative rejection is communicated soon after Project Access calls close).

This re-application will be easy for applicants, especially if in the future the two calls use the same forms as described above.

This will facilitate the redirection of proposals from Tier-0 to Tier-1 should their computational requirements be too small for PRACE Project Access. Experience has shown that the opposite redirection (DECI Tier-1 to PRACE Project Access Tier-0) is not necessary as DECI does not receive larger computational requests that cannot be serviced.

- DECI Industrial programme

As illustrated in Section 5.3.2 below, industrial participation in DECI calls is low. To encourage this participation, a tailored DECI Industrial programme could be created and implemented.

### 5.3.1 Analysis of global ranking for DECI

Proposals from academia and industry are eligible for DECI funding, as long as the project leader is undertaking non-proprietary research in a European country (European Union, candidates, associated countries and PRACE member countries). Proposals that come from countries which contribute resources to DECI are classed as internal proposals; proposals from other countries are classed as external. As DECI is a resource exchange programme computing time is awarded via the *juste retour* principle where internal projects receive in total at least 70% of the amount of resources contributed to DECI by the project leader's own country. The remaining resources (up to 30% of the total computing time) are awarded to external projects.

Internal proposals are scientifically reviewed by national panels while external proposals are reviewed by scientific reviewers from the Tier-0 Project Access pool of scientific reviewers provided by the PRACE aisbl. Occasionally, internal proposals are reviewed by the Tier-0 pool. This usually happens if a country is new to DECI or if there are very few applications from the country in question. National panels and the external reviewers give a score to each proposal and all rank their respective subset of applications based on scientific excellence. Participating country's review panels, and the external review panel, each produce a ranked list of proposals and how far down the list to accept proposals is determined by the *juste retour* principle. For each call, the set of ranked lists are recorded centrally in the DECI Project Management Database (DPMDB).

However, the individual scores are not recorded centrally. Given access to all of the scores it would be interesting to determine how many projects would be accepted using a global ranking, rather than the *juste retour* principle.

Of the 66 DECI-14 proposals (the last call to be assessed) we have access to the scores for the 15 proposals from the UK and the 18 external proposals meaning we can carry out some analysis of 33 (i.e. half) of the 66 DECI-14 proposals. Overall 40 of the 66 proposals were accepted (61%). If the same rate of acceptance was applied to the 33 UK and external proposals, then the top 20 rated proposals would be accepted. In the end, 9 UK proposals and 4 external proposals were accepted (13 in total). Based on the number of proposals alone, this would imply that a further 7 proposals would have been accepted if global ranking were applied. However, in order to do a full analysis the size of each project (in terms of CPU resources awarded) would also need to be considered.

For DECI-15, opened in January 2019, all of the scores will be recorded to carry out an analysis across all of the proposals, also taking into account the size of projects, which should provide a more meaningful insight into how the *juste retour* principle compares with simply ranking the proposals globally.

### 5.3.2 Industry DECI statistics

The following table identifies, over all DECI calls throughout the years:

- The number of applications submitted, how many of these were accepted and how many rejected
- The number of applications with industrial involvement submitted, how many of these were accepted and how many rejected
  - The number of applications with an industrial Principal Investigator submitted, how many of these were accepted and how many rejected
  - The number of applications with an industrial Collaborator submitted, how many of these were accepted and how many rejected.

<b>DECI Call</b>	<b>Year</b>	<b>#Proposals / Accepted / Rejected</b>	<b>#Proposals with Industry/ Accepted / Rejected</b>	<b>#Proposals with Industry PI / Accepted / Rejected</b>	<b>#Proposals with Industry Collaborator / Accepted / Rejected</b>
DECI-1	2005	30, 30, 0	0, 0, 0	0, 0, 0	0, 0, 0
DECI-2	2006	41, 28, 13	0, 0, 0	0, 0, 0	0, 0, 0
DECI-3	2007	62, 44, 18	0, 0, 0	0, 0, 0	0, 0, 0
DECI-3e	2007	14, 14, 0	0, 0, 0	0, 0, 0	0, 0, 0
DECI-4	2008	66, 42, 24	0, 0, 0	0, 0, 0	0, 0, 0
DECI-5	2009	75, 50, 25	<b>1, 0, 1</b>	<b>1, 0, 1</b>	0, 0, 0
DECI-6	2010	121, 56, 65	<b>1, 0, 1</b>	<b>1, 0, 1</b>	0, 0, 0
DECI-7	2011	54, 35, 19	<b>3, 2, 1</b>	<b>0, 0, 0</b>	<b>3, 2, 1</b>
DECI-8	2012	49, 33, 16	<b>1, 0, 1</b>	0, 0, 0	<b>1, 0, 1</b>
DECI-9	2012	45, 31, 14	<b>2, 1, 1</b>	<b>1, 1, 0</b>	<b>1, 0, 1</b>
DECI-10	2013	56, 37, 19	<b>4, 3, 1</b>	<b>2, 2, 0</b>	<b>2, 1, 1</b>
DECI-11	2013	115, 52, 63	<b>1, 1, 0</b>	<b>1, 1, 0</b>	0, 0, 0
DECI-12	2014	60, 34, 26	<b>1, 1, 0</b>	0, 0, 0	<b>1, 1, 0</b>
DECI-13	2015	114, 57, 57	<b>2, 1, 1</b>	<b>1, 1, 0</b>	<b>1, 0, 1</b>
DECI-14	2017	66, 40, 26	<b>2, 1, 1</b>	<b>2, 1, 1</b>	0, 0, 0
<b>Total</b>		<b>968, 583, 385</b>	<b>18, 10, 8</b>	<b>9, 6, 3</b>	<b>9, 4, 5</b>

**Table 7: Industry DECI statistics**

It is clear to see that the number of industrial DECI applications received is low – constituting just 2% of the total received with just over half of these being accepted. More efforts clearly need to be made to encourage DECI industrial applications.

Engaging with industry is generally a task which PRACE can better achieve through PRACE partners acting as the first contact between industry and HPC engagement. Reasons for this include language and custom barriers, but also because local PRACE partners know better the industrial market in their country. Because of this, they can better identify the companies which can be approached and encouraged to apply for DECI access.

It is thus best, that on a trial basis DECI creates its own industrial programme. This means that industry will be given more favourable conditions to enable access, e.g. through a reserved amount of resources for industry, similar to the pilot that the Tier-0 programme will have in Call 19.

## 6 Summary

During the second period of the PRACE-5IP project a new key player has appeared in the HPC ecosystem, namely the EuroHPC JU. In this deliverable, we have reported on the potential relation of PRACE with regards to this new high-level funding programme. The developments and improvements in the PRACE 2 Programme are also reported as a demonstration of the current PRACE services and support of the offer of PRACE to EuroHPC.

Also, 2018 has been the year of entry into force of GDPR. The present deliverable has reported on the efforts of the WP2 legal team to adhere to this new Data Protection regulation, by identifying the uses and flows of personal data through the PRACE infrastructure, with the objective to establish the necessary agreements between the affected parties. Legal support has also included assistance to PRACE training programmes and recommendations for the management of career breaks in PRACE Tier-0 projects.

The analysis of the Trans-National Access to infrastructures funding mechanism has continued, and in this deliverable we have reported on the results of PRACE Project Access (Tier-0) Calls 14 to 17, including the number of projects received, projects awarded, resources distributed and their tentative cost.

As a complement to the exhaustive review of the PRACE Tier-0 access programme, we have further extended the analysis of the Tier-1 access (DECI) programme, towards a future convergence of these two programmes. This includes comparison of the application procedures and a preliminary analysis of a global ranking of DECI proposals.

## 7 Annex 1 – Call for Tender for legal assistance within the framework of the European PRACE-6IP project

### Specification of services in the area of legal assistance within the framework of the European PRACE-6IP project

#### 1. General information on the contracting authority

Forschungszentrum Juelich GmbH(www.fz-juelich.de) makes a vital contribution to solving major challenges facing society in the fields of information, energy, and bioeconomy. It focuses on the future of information technologies and information processing, complex processes in the human brain, the transformation of the energy system, and a sustainable bioeconomy. Forschungszentrum Juelich develops simulation and data sciences as a key research method and makes use of large, often unique, scientific infrastructures. Its work spans a range of topics and disciplines and it exploits synergies between the research areas. With some 5,900 employees, Jülich – a member of the Helmholtz Association – is one of Europe's large research centres.

#### 2. Initial situation of this contracting procedure

##### The Partnership for Advanced Computing in Europe (PRACE) Project and its outcomes

###### 2.1 PRACE Research Infrastructure – PRACE AISBL

PRACE, the Partnership for Advanced Computing in Europe, is established as an international not-for-profit association under Belgian law (association internationale sans but lucrative – AISBL) and has its seat in Brussels.

In November 2006, [ESFRI](#), the European Strategy Forum on Research Infrastructures, presented its first roadmap, based on its work over two years. This document covered “35 research infrastructure projects of pan-European interest at various stages of development and 7 principal research fields: environmental sciences; energy; materials science; astrophysics, astronomy, nuclear and particle physics; biomedical and life sciences; social sciences and humanities; computer and data processing”.

Of these 35 projects, the need for a pan-European Petaflop High Performance Computing (HPC) infrastructure was acknowledged as being absolutely essential and critical for the European competitiveness.

A number of EU Member States decided to coordinate their efforts to create such a structure and launched the PRACE Initiative with the signing of a Memorandum of Understanding on 17 April 2007. The same Member States initiated the PRACE Preparatory Phase in 2008, which resulted in the founding of PRACE AISBL on 23 April 2010.

Currently, PRACE AISBL has 26 Member countries whose representative organisations create a pan-European supercomputing infrastructure, providing access to computing and data management resources and services for large-scale scientific and engineering applications at the highest performance level.

The computer systems and their operations accessible through PRACE are provided by 5 PRACE Hosting Members (BSC representing Spain, CINECA representing Italy, ETH Zurich/CSCS representing Switzerland, GCS representing Germany and GENCI representing France). Four Hosting Members (France, Germany, Italy, and Spain) secured funding for the initial period from 2010 to 2015. In 2016 a fifth Hosting Member, ETH Zurich/CSCS (Switzerland) opened its system via the PRACE Peer Review Process to researchers from academia and industry.

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

PRACE also seeks to strengthen the European users of HPC in industry through various initiatives. PRACE has a strong interest in improving energy efficiency of computing systems and reducing their environmental impact.

## 2.2 PRACE 2 Agreement

On 3 March 2017, at the occasion of the 25th PRACE Council Meeting in Amsterdam, the PRACE Members ratified a Resolution to proceed with the second phase of their Partnership: PRACE 2. The PRACE 2 programme defines the second period of PRACE from 2017 to 2020. With this agreement, PRACE is strengthening Europe's position as world-class scientific supercomputing provider, a technology considered a key enabler for knowledge development, scientific research, big data analytics, solving global and societal challenges, and European industrial competitiveness.

For the PRACE 2 programme, the PRACE Members have defined the underlying funding model of the Research Infrastructure, based on the contribution of the 5 Hosting Members and the General Partners. The European Commission supports specific PRACE activities via funding of R&D projects.

The new PRACE 2 programme helps to create a fertile basis for the sustainability of the infrastructure, in order to continue fostering world-leading science as well as enabling technology development and industrial competitiveness in Europe through supercomputing. This is being accomplished through:

- Provisioning of a federated world-class Tier-0 supercomputing infrastructure that is architecturally diverse and allows for capability allocations that are competitive with comparable programmes in the USA and in Asia.



- A single, thorough Peer Review Process for resource allocation, exclusively based on scientific excellence of the highest standard.
- Coordinated High-Level Support Teams (HLST) that provide users with support for code enabling and scaling out of scientific applications / methods, as well as for R&D on code refactoring on the Tier-0 systems.
- Implementation actions in the areas of dissemination, industry collaboration, and training, as well as the exploration of future supercomputing technologies that will include additional application enabling investments co-ordinated with the support team efforts.

### 2.3 The 6<sup>th</sup> PRACE Implementation Phase (PRACE-6IP) Project

The 6th PRACE Implementation Phase Project is coordinated by the Forschungszentrum Juelich GmbH, represented by Dr. Thomas Eickermann, and will begin its work as of 1 May 2019 with a duration of 32 months, that is until 31 December 2021.

The objectives of the PRACE-6IP Project are as follows:

- To build on and seamlessly continue the successes of the Partnership for Advanced Computing in Europe (PRACE) and start new innovative and collaborative activities..
- To carry out the dissemination, training services and user support, including the operation of the joint infrastructure, the porting and optimisation of applications to operate a sustainable European network of world-class computing centres; to support Tier-0 users and communities with novel software solutions, and new user needs, new user communities and new applications.

The PRACE-6IP Project receives a €24 M grant from the European Commission towards its total budget of €28 M.

For carrying out its work, the Project has been structured into 8 Work Packages (Appendix I “Description of Work” of the above mentioned Grant Agreement):

- **4 non-technical Work Packages:**
  - WP1: “Management of the contract”
  - WP2: “Sustainability and development of the RI”
  - WP3: “Communication, Dissemination, Outreach and Events”
  - WP4: “Training”
- **3 technical Work Packages:**
  - WP5: “HPC Commissioning and Prototyping”
  - WP6: “Operational Services for the HPC Ecosystem”
  - WP7: “Application Enabling and Support”

- WP8: “Forwarding-looking Software Solutions”

Each Work Package must regularly submit deliverables to the European Commission, to allow it to assess the progress being made by the Project.

For more information about H2020 and the PRACE-6IP Project, please refer to the following sites:

<https://ec.europa.eu/programmes/horizon2020/>

<http://www.prace-ri.eu/prace-implementation-phases/>

## 2.4 Governance aspects

The **PRACE-6IP Project** is governed by the following bodies:

- A decision-making body: The “Management Board” with one voting representative for each project Partner.
- Two executive bodies: The “Technical Board”, consisting of the Work Package leaders, with responsibility for the technical supervision, and the “Project Management Office” with responsibility for managing the contract.

The **PRACE AISBL** is governed by following bodies:

- A decision-making body: The PRACE Council
- An executive body: The Board of Directors
- Three advisory bodies: The “Scientific Steering Committee” with responsibility for proposing scientific directions. The “Industrial Advisory Committee” with responsibility proposing industrial directions. The “Access Committee” gives advice to the Board of Directors concerning the allocation of resources of the PRACE Research Infrastructure.

## 2.5 Intended outcomes: Further development of the PRACE Research Infrastructure in the context of the EuroHPC Joint Undertaking

The PRACE-6IP Project will continue providing support to a sustainable research infrastructure and service enabling world-class computer simulations for leading edge scientific and technological projects. The necessity of a European level service, complementing national and thematic resources, is a result of the technological trend and of the deliberate positioning of very large facilities in Japan and the USA well above configurations made available in response to market requirements.

The aim of the PRACE organisation is to deliver world-class HPC services to scientific and industrial user communities in Europe. The PRACE research infrastructure (PRACE RI) is organised as a single non-profit legal entity, to define and finance these services. Operations are performed by seven distributed centres hosting world-class computers, the Tier-0 systems

distributed across the principal partner's countries. This covers the planning, financing, acquisition, housing, operation, maintenance, and support (including user support) of the Tier-0 systems including their periodic renewal and continuous upgrade. PRACE is also assuring that these systems are easily accessible to European users through technological (e.g. grid technologies) and political/social integration (through the creation of effective lines of communication with stakeholders) into a European HPC ecosystem.

PRACE RI is providing access to a number of different Tier-0 architectures and platforms distributed across different countries in order to optimally cover the different scientific domains and application classes.

PRACE RI collaborates with the European IT-industry to influence the development of emerging hardware and software technologies for promising future architectures. The infrastructure is complemented with network and grid access, and the services required to enable applications.

These include development of parallel application software expertise, packages, and data handling.

PRACE RI will represent a significant step forward for the European Research Area as a world-class infrastructure which cuts across disciplines and will address major challenges through its support of the best research in Europe. High-performance computing has a strong impact in terms of maintaining the strategic competitiveness of Europe and increasing its attractiveness for foreign or returning European researchers and for supporting industrial development.

With the creation of the EuroHPC Joint Undertaking on 27 October 2018 a new player in the European HPC era was added. EuroHPC is a specific instrument to provide a new legal framework to coordinate national and European efforts for HPC. EuroHPC should buy and deploy by 2020 the two fastest supercomputers in the EU and at least two other competitive supercomputers with a lesser performance lever. These machines will be made available throughout Europe to public and private users. In addition, the development of a European supercomputing ecosystem will be supported with research and innovation actions. These actions will as well stimulate a technology supply chain and will make supercomputing technology available to more users. The overall budget for this initiative is 1 B€ PRACE with a well-established and recognised peer review process is expected to collaborate with the EuroHPC as executive arm providing different services, e.g. peer review process, training, code enabling. One of the objective of this tender is to find a suitable advisory firm assisting PRACE in the contractual relation with EuroHPC.

## 2.6 Specifications for tenders

### Context of the consultation

As shown above, the PRACE-6IP Project has been divided into Work Packages constituting a comprehensive work plan for sustaining and developing the PRACE Research Infrastructure.

WP2 – “Sustainability and development of the RI” – has, amongst others, the following objectives:

- To provide organisational and legal support for the development of PRACE 2,
- To support PRACE AISBL operations,
- To support stakeholders management and international collaborations,
- To support the impact assessment methodologies (KPIs) of PRACE,
- To monitor and report on the provision of Tier-0 and Tier-1 resources,
- To support the strategy of DECI and Tier-1 programme.

In order to fulfill its mission, PRACE AISBL is supported by the 6<sup>th</sup> PRACE Implementation Phase (PRACE-6IP) Project, **coordinated** by one of PRACE AISBL’s members, the **Forschungszentrum Juelich GmbH**.

### 3. Tasks of the contractor

#### 3.1 Requests

The requests are for, in the context of providing support to WP2 of the PRACE-6IP Project:

*1) Expert advice on the legal and fiscal questions for the PRACE Implementation Phase projects and for the European Research Infrastructure PRACE aisbl, and*

*2) Advice and preparation of the necessary legal documentation for the next evolution step PRACE 3 in relation to the EuroHPC Joint Undertaking.*

The selected law firm must provide their advice and recommendations addressing the points listed below and building on previous work done by the PRACE Implementation Phase Projects and PRACE AISBL.

#### **Lots:**

For the sake of getting the best advice for different fields, 5 lots are used.

#### **Lot 1 – Fiscal Law**

The selected law firm must provide expertise in tax-related issues for the AISBL.

In particular, the selected law firm must be able to analyse the impact of VAT:

- On the income and expenditure of the AISBL, at the level of the AISBL, but especially at the level of the European partners.
- On a possible evolution of the governance of the AISBL.

In addition, the selected law firm must be able to propose ways of optimising local taxation.

In addition, the selected law firm must be able to answer any tax-related questions resulting from changes in the AISBL structure or its members, changes in funding or sources of funding (e.g. European Commission funding) or changes in the way computing time is allocated.

The selected law firm must be able to answer questions relating to a potential situation where PRACE AISBL purchases its own equipment, especially as regards to:

- Insurance of the equipment,
- Taxation of allocation of resources,
- Potential considerations of state aid.

Additionally, the selected firm must be able to answer questions regarding financial and legal topics related to the participation of PRACE AISBL in projects funded by the European Commission, with a special attention to the H2020 framework programme and its future continuations. More specifically, the selected firm must have expertise and be able to advice on the implementation of grants (in cash or in kind) by PRACE AISBL. E.g.: fellowships, awards, trophies, allowances.

#### **Lot 2 – Trade Law / NICT**

The selected law firm will be in charge of providing expertise in the following areas:

- Commercial law: sale and purchase,
- Implementation of the General Data Protection Regulation (REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 April 2016).

#### **Lot 3 – Corporate Law**

The selected law firm must provide expertise in issues relating to the governance of PRACE AISBL, both from a national point of view (especially from Belgium, but not limited to it) and from a European point of view. Additionally, the firm must provide expertise and solutions towards a potential evolution of the AISBL structure (European company, ERIC, others).

#### **Lot 4 – Competition Law / Public Law**

The selected law firm will be in charge of providing expertise in the following areas:

- Application of the rules on competitive tendering: applicable law, procedures, monitoring of legal developments relating to these rules,
- Competition law: impact study on the free allocation of computing time to industrial researchers.

**Lot 5 – Social Law / Labour Law**

The selected law firm will be in charge of providing expertise in the field of employment law:

- To carry out an audit of current employment contracts and propose changes,
- Analysis of the applicable social regulations: collective agreement / branch agreement, implementation of internal regulations, mandatory signage, health regulations, election of staff representatives,
- To propose corrective actions following the social and regulatory analysis of the PRACE AISBL.

**The tenders are free to apply for all or only selected lots !!**

**3.2 General expectations**

- The capacity to commit in recommendations within the consultation scope and adapted to the specific requirements;
- Compliance with the defined deadlines;
- The ability to concisely state the recommendations;
- A high degree of availability and the ability to demonstrate a reactive capability and coherence with regard to the requests of the PRACE-6IP Project;
- The ability to work in concert with the WP2 participants.

**3.3 Criteria for judging the requests to participate**

A detailed evaluation matrix will be given in enclosure no. 4 Evaluation matrix  
„Request for Participation“

**4. Place of performance**

All communication (oral and written) will take place online, by e-mail, during meetings or conferences on-site, in video- and phone conferences.

**5. Contract timeline**

5.1 Publication of tender documents concerning Request to participate:

February 15th, 2019

5.2 Submission date “request to participate”: March 18th 2019, 03:00 pm

5.3 Publication of Request for quotation including invitation for on-site company presentation in Brussels addressed to the selected candidate firms: Presumably March 25th, 2019

5.4 Submission date proposal statement (quotation): Presumably April 30th, 2019

5.5 On-site company presentation in Brussels, presumably week 19/2019

5.6 Start of contract: Presumably June 01st 2019

5.7 Duration of contract: 3 years with an optional prolongation of 2 years

## **6. Important remarks:**

6.1 The contract will be awarded on base of your first quotation. The contract decision will be drawn as soon as possible after all company presentations have taken place in Brussels. There will be no further Request for second- or final quotation. The quality of the company presentation is the final criterion to be rated.

6.2 A further detailed evaluation matrix will be sent together with the Request for Quotation to the selected candidate companies.