

ANNEX IV – THE PRACE PEER REVIEW AND ALLOCATION PROCESS

1 Introduction

PRACE provides state of the art Tier-0 resources and services to European scientists for research projects of transformative value to society, science and engineering. The Peer Review process has the sole goal of selecting proposals based on the highest possible scientific and technical standards. The proposals are reviewed by external experts, and then a scientific ranking is performed by the Access Committee (AC). The Resource Allocation Session (RAS) combines the scientific ranking with technical constraints on PRACE resources and submits a recommendation to the PRACE Board of Directors (BoD). The overall process is supervised by the PRACE Scientific Steering Committee (SSC).

2 Calls for Proposals

Calls for proposals for Tier-0 resources are approved by the PRACE Council. Currently PRACE has had 2 such calls per year; the frequency and characteristics of future calls will be determined by the Council.

Scientists and researchers from academia and industry can apply for access to PRACE resources. Only proposals with a civilian purpose will be eligible to participate in PRACE calls for proposals.

The deadline for the submission of proposals is currently 8 weeks after the opening of the call.

Periodic meetings are organized to help proposers learn about the review process and the requirements for successful submissions.

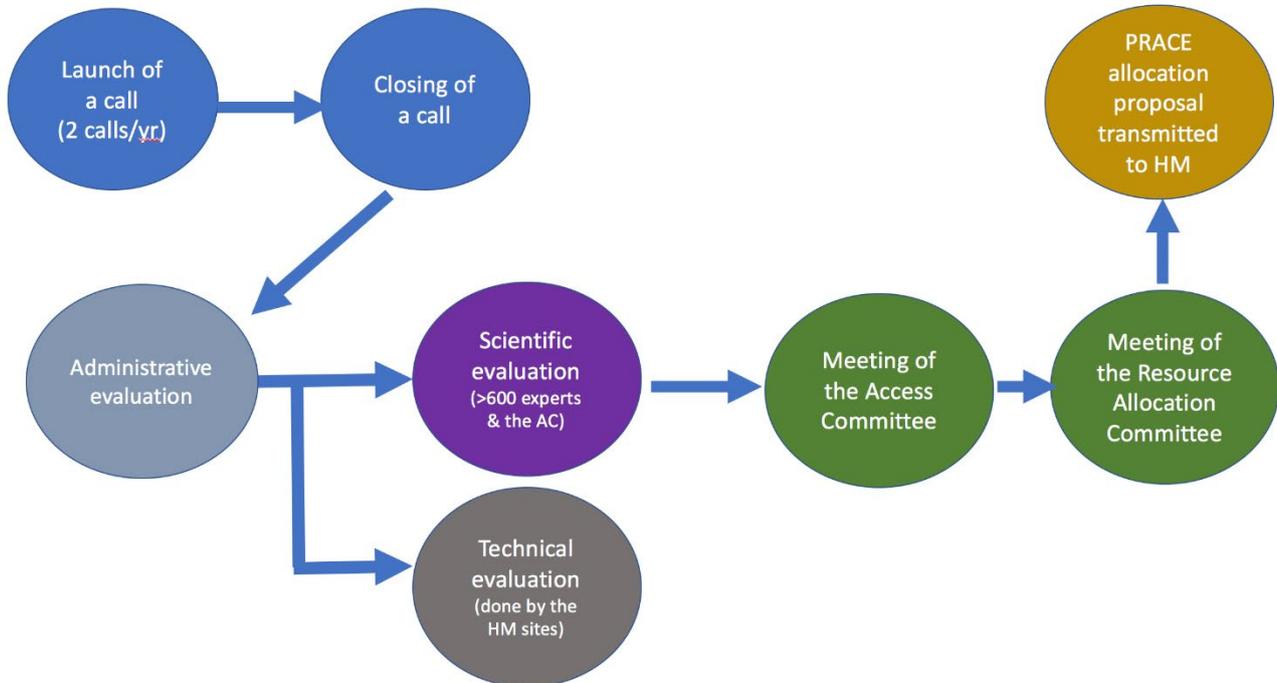
3 Proposal contents

Only material fully included in the Tier-0 project proposal itself will be reviewed. The AC together with PRACE staff can decide on a length limit to avoid overburdening reviewers.

1. The proposal must contain the following information:
 - 1.1. Abstract
 - 1.2. Background and significance
 - 1.3. Scientific goals and objectives
 - 1.4. Description of models, numerical methods, algorithms, and software
 - 1.5. Specific tasks and milestones
 - 1.6. Visualization, pre- and post-processing needs
 - 1.7. HPC approach (parallelization, architectures, software) and memory requirements. This should be justified in terms of time to solution and the suitability of the hardware requested, e.g. the fraction of peak performance that can be attained.

- 1.8. Representative benchmarks and justifications about the use of the software code proposed compared to alternatives in terms of science milestones along with time to solution and code efficiency (including strong and/or weak scaling) for this problem.
- 1.9. Performance analysis: Short test periods (and specific tools) are provided by PRACE HMs (and other HPC centres at the national or international level) to carry out this analysis. The purpose of this analysis is to quantify the readiness of the proposal for Tier-0 resources and to understand whether suggested codes run efficiently on PRACE systems and how they can be further optimized if necessary.
- 1.10. The final performance analysis should be performed on the system targeted in the application, or one that is essentially identical.
- 1.11. Resource justification: the proposal needs to list all tasks to be completed within the project and calculate the resources requested on the basis of the benchmarks previously performed.
- 1.12. An explicit statement whether the proposal is a continuation or resubmission from a previous call (either as Principal Investigator, PI, or a team member) or if it is a new one.
- 1.13. A data management plan: This should cover both short-term and long-term aspects, including needs for I/O bandwidth, number of files and input/output data volumes, how long the data will be stored at the centre after the project, how it will be moved from the centre, and how subsequent analysis will be performed. There should be a statement regarding the potential availability of both code and data to other researchers, and how this will be handled. PRACE should be given credit for all data produced through PRACE allocations when publishing, and described in the provenance when depositing to other infrastructures.
- 1.14. Previous results: Any results of relevance to the project need to be listed to demonstrate how the proposal contributes to the long-term goals of the proposer. Research publications that resulted from previous allocations should also be listed.
- 1.15. A communication plan for the results, describing the strategy and timeline for scientific publication, conference presentation (e.g. by the PI at PRACEdays), and other public outreach events.
2. Track record, to include
 - 2.1. Curriculum vitae and list of publications of the Principal Investigator
 - 2.2. Granted patents and other measures for the relevance of the work
 - 2.3. Prior allocation history in PRACE, national calls, as well as international programs such as INCITE of the US DoE
 - 2.4. List of reports on previous PRACE allocations
 - 2.5. Participation by team members in other EC actions, such as ERC or Marie Skłodowska-Curie EC grants
 - 2.6. Previous presentations at PRACEdays

4 Review process overview & administrative assessment



The PRACE review process includes both administrative, technical, and scientific assessment and is structured as described below:

1. Completed proposals will be subjected to an administrative assessment, which should be completed in 1 week. If this is not passed due to minor oversights the applicant may be allowed to amend the application (which has to be completed before the end of the administrative assessment timeframe), but major shortcomings will result in rejection.
2. Passing proposals will be subjected to both technical and scientific assessment.
3. Technical feasibility assessment will be done by the relevant Tier-0 site(s); technical reports will be made available to scientific reviewers and to the Access Committee for its evaluation
4. External scientific review reports will be contributed by international experts selected by the PRACE Access Committee (AC), with assistance of PRACE staff.
5. The applicants can provide a reply to the comments of the technical reports and scientific review reports. For minor technical shortcomings, the applicant can be allowed to amend the application.
6. The main mission of PRACE is to provide Tier-0 allocations that are difficult or impossible to realize nationally. To achieve this, PRACE will only consider projects that ask for at least 1% of the total resources available in the call. This limit can be waived for industrial projects and other special usage, as decided by the Council.
7. The technical assessment and scientific review reports will be taken into account by the PRACE AC that will rate the projects and make a scientific prioritization to the PRACE Resources Allocation Session (RAS).

8. The RAS will apply the rules set by the PRACE Council and produce an allocation recommendation, which is signed by the BoD.
9. While the scientific ranking is not public, in the interest of transparency the results from the recommendations from both the AC and RAS will be made available to the PRACE Council and relevant PRACE bodies.

5 Technical assessment

1. The technical assessment period will start as soon as the administrative assessment is finished, no later than 1 week after the application deadline.
2. The centres should communicate their initial evaluation to the applicants within 1 week, including any technical reasons why the applicant might want to alter the resources requested. The applicants should then have 1 week to directly interact with the centres and address or explain any technical concern. PRACE staff must be informed of all interactions.
3. The tier-0 sites will produce a final technical assessment in a maximum of 4 weeks, which means the technical review should be completed 5 weeks after the application deadline. This report will be made available to the external scientific reviewers and the AC through the PRACE office.
4. Technical reviewers are asked to evaluate:
 - 4.1. Application performance and scalability on the PRACE systems required. The focus should be on time-to-solution, efficiency of the solution for the scientific problem, as well as overall resource utilization, in addition to strong and weak scaling. There should be explicit comparisons with relevant codes in each scientific domain in terms of time to solution, percentage of peak and weak and strong scalability for the sizes that are to be performed in the projects.
 - 4.2. Suitability of requested PRACE platform
 - 4.3. Whether or not the applicant provides a suitable breakdown of the resources requested to carry out the simulations
 - 4.4. Whether or not the resource request is consistent with the simulations proposed in the project plan
5. The technical assessment can recommend that proposals are:
 - 5.1. Accepted
 - 5.2. Rejected
If the rejection on technical grounds is overridden by the Access Committee based on scientific merits of the proposal, after agreement of the concerned hosting member during the meeting of the RAS, allocations can be awarded only after the applicant has re-submitted an update that resolves the concerns of the technical review report.
 - 5.3. Conditionally accepted
Reasons are provided to justify conditional acceptance. The proposal may be accepted without further work necessary on the proposer's side if the Access Committee so recommends.

6. For technically rejected and conditionally accepted proposals, the technical assessment shall include a report with possible measures and time frames to solve the technical issues in the proposal. This report can include recommendations to apply for PRACE Preparatory Access or PRACE support programs (e.g.: HLST). Proposals technically rejected or conditionally accepted will also be submitted to the AC for their evaluation.

6 Scientific assessment

1. The scientific assessment is handled by the AC with assistance of PRACE staff, and will start as soon as the administrative assessment is finished, no later than 1 week after the deadline for submission of proposals.
2. The AC Chair and vice Chair, with the help of the PRACE office, assign two AC Rapporteurs for each proposal within 2 days after receiving the list of proposals by the PRACE Office. These members act as Rapporteurs of the proposals that take into account the external review reports as well as their own reading of the proposal. There will be one lead and one secondary AC Rapporteur. An effort must be made to have complementary views between the assigned AC members, where the lead AC Rapporteur should ideally have detailed topic knowledge. At the same time, it is important to balance the workload of the AC members so as to ensure efficiency of the process.
3. Each proposal should normally be reviewed by at least three external experts (only three reports will be used). The AC (under coordination of the two AC Rapporteurs) will nominate six reviewers for each proposal, in their preferred order, within 1 week. This order will involve the first two of the first Rapporteur followed by the 3 of the second Rapporteur and as last the third proposer of the first Rapporteur. PRACE staff will check conflicts of interest, availability, and recurrence, but otherwise pick external reviewers in the nominated order and contact them.
4. A resubmitted project cannot be evaluated more than once in a three-year period by the three same external reviewers. If possible, at least one reviewer from the previous application will be maintained.
5. The appointment of external reviewers should be completed in 2 weeks, at which point they also get access to the proposals. 4 weeks into the scientific assessment the technical reports are completed, and made available to the reviewers. The scientific review reports must be submitted 6 weeks after the reviewers were appointed and received the proposals (i.e., 4 weeks after receiving the technical reports).
6. External reviewers must be international experts recognized in their field, normally scientists at the Associate or Full Professor level and at least 2 years beyond the postdoctoral level. Emphasis on interdisciplinary scientists with a demonstrated track record in HPC is encouraged.
7. Measures for improving the selection of external reviewers include
 - 7.1. The track record of the past reviewers will be monitored.
 - 7.2. Recommendations made by AC members during the AC scientific assessment will be honoured to build up a database of reliable reviewers and their fields of expertise for future calls. Emphasis must be placed on scientists with interdisciplinary expertise, and this database can be shared with other organizations. Reviewers who provide reviews that are very generic or of limited quality will be removed from the pool.
 - 7.3. Applicants can suggest up to three Reviewers, and ask to exclude up to three Reviewers.

8. The scientific reviewers are particularly asked to evaluate:
 - 8.1. Significance of the proposed research for the solution of challenging scientific and societal problems.
 - 8.2. Soundness of numerical methods, algorithms and computational tools. The Reviewers must specify strengths and weaknesses of the proposed research. They must include comparisons with respect to the state of the art in the field in terms of computing, methodology and expected outcomes.
 - 8.3. Appropriateness of project timeline and resources (Is the project plan realistic, are requested resources sufficient and fully justified, is a Tier-0 system/allocation necessary?)
 - 8.4. Are the requested resources justified, or could the application be reduced?
 - 8.5. Is the Research plan realistic within the given time and resources?
 - 8.6. The PI and team qualifications (Does the background and experience of the PI and her/his team make a successful outcome of the project likely?)
 - 8.7. In the case of continuation of previous awarded projects, the reviewers will be asked to review the added value of the new project and the advances over the previous one.
 - 8.8. The provided dissemination plan of the results in scientific journals and conferences
9. The applicants should have 1 week to provide a reply to the comments of the scientific reviewers. When the reviewers have suggested a reduction of resources, the applicant will have to explain the impact of such reduction in the proposal.

7 Scientific Ranking by the Access Committee

1. The role of the AC discussion and ranking is to ensure a fair scientific ranking between all proposals handled by different external reviewers.
2. It is important that AC members have a strong sense of responsibility for advancing the best science across fields, rather than advocating particular domains or nationalities, and that they fully read the applications for which they are Rapporteurs. The Chair of the AC has the responsibility to ensure this interdisciplinary approach and to ensure allocations according to scientific merit rather than an area or country of origin.
3. The AC members receive all submitted proposals together with technical and scientific review reports 5 weeks before the AC meeting, and comments from the applicants 1 week later. The AC Rapporteurs submit their summary reports, along with a proposed overall score for each proposal, 2 weeks before the meeting. All reports are made available to all members of the AC. The PRACE office lists the proposals according to the Collective scores received for each proposal. All scores and names of the Reviewers must be available to all members of the AC.
4. The AC is collectively responsible for the scientific assessment of every proposal, as well as a detailed written statement justifying its decision, based on the external review reports, replies from applicants, and AC discussion. During the Prioritisation Panel meeting of the AC, the Lead Rapporteurs will summarize all reviews of a proposal and propose a score, suggested allocation and a summary statement. The scientific ranking decision is made by the entire AC.

5. In case it is necessary to handle a large number of applications, the AC is allowed to triage applications and only provide a shorter statement for those not reaching the threshold.
6. The AC, with support from the Peer Review Office, should evaluate previous performance by the PI, when applicable, in meeting PRACE requirements. In particular, the AC will take into account:
 - 6.1. previous usage of PRACE resources,
 - 6.2. that the usage of PRACE resources is acknowledged in scientific publications,
 - 6.3. projects submit high-quality final reports,
 - 6.4. Whether the project has had additional secondary impact e.g. by producing important datasets made available in open repositories to researchers once the post-processing and analysis are finished (PRACE also encourages the usage and development of Open Source software),
 - 6.5. that PIs have been willing to present their work at least once every two years at PRACEdays in oral or poster formats.
7. The AC will award each proposal a final integer score.
 - 5: Outstanding – proposal should be awarded with the highest priority
 - 4: Excellent - proposal should be awarded
 - 3: Good - proposal should be awarded if resources are available
 - 2: Fair - proposal should not be awarded if resources are limited
 - 1: To be improved - proposal should not be awarded, even if resources are available
8. Regardless of the scientific ranking, some proposals might fall outside the scope of PRACE, e.g. for technical reasons. If the AC decides a proposal is out of scope it will not be prioritized for allocation, but when possible they will still try to assign it a score based on the scientific quality.
9. The AC will produce a ranked scientific prioritization list of the proposals (including suggested allocations). The AC chair is responsible for submitting the recommendations of the AC to the Resources Allocation Committee within 2 days after the AC meeting.
10. Proposals rejected regardless of the resources (score 1) by the AC cannot be resubmitted in the next PRACE Call.
11. Proposals with good scientific and technical merits that were not awarded access due to resource limitations may be considered in future calls and PIs are eligible to resubmit a revised application and have it reviewed again. Past scientific evaluations will be taken into account.
12. AC members should be physically present at the meeting. In exceptional circumstances and for only one time, the AC chair can approve for an AC member to participate through video-conference. Two physical absences from allocation meetings disqualify AC members.
13. For each call, the AC writes a final report within 1 month after the finalisation of each Call. The SSC will provide a written assessment of its opinion of the overall Peer Review process for that Call, and both documents are then submitted to the Council. This Report must include explicit comments on the work of the AC and provide feedback and propose measures for improvement when necessary (for instance asking to replace AC members who have not been able to handle the workload). This Feedback must be available to the AC before the beginning of the next Call.

8 Allocation Recommendation by the PRACE Resource Allocation Session

1. The RAS will be chaired by the PRACE MD, and will include the members of the BoD appointed to the Peer Review Process, the AC Chair (or vice Chair), one representative of each Tier-0 site, and the PRACE Peer Review staff. Technical staff from the Tier-0 sites will be present as advisors.
2. Observers from the BoD, SSC, PRACE members, and funding agencies will be allowed.
 - 2.1. Applications for observers need to be submitted to PRACE BoD before the end of the scientific review process.
 - 2.2. The number of observers may be limited for practical reasons. The following minimum observer seats will always be ensured:
 - 2.2.1. One seat for the BoD
 - 2.2.2. One seat for the SSC
 - 2.2.3. One seat for each PRACE Hosting Member
 - 2.2.4. Three seats for PRACE General Partners
 - 2.2.5. Hosting members and General partners can invite funding agencies to take any of their seats
 - 2.2.6. All observers must sign certificates of confidentiality commensurate with those signed by all AC members.
3. PRACE BoD will provide to the RAS the relevant decisions from the PRACE Council (notably quotas and their tolerance), in order to define the algorithm that will be used to perform the allocation decision. This algorithm will be defined before the RAS.
4. The RAS will make a strong effort in maximizing the use of resources and PI demands, while respecting the scientific ranking produced by the AC. Technical advisors from the Tier-0 sites, and representatives from each HM, will be consulted to this end.
5. PRACE staff will apply the algorithm to allocate the resources, following the ranked list provided by the AC. The resources will be allocated in rounds.
 - 5.1. Resources will as far as possible be allocated according to the advice of the AC based on the scientific ranking list.
 - 5.2. Should the resources from a system be exhausted, the technical staff from the centres will advise about the technical feasibility to allocate the proposal into another system with available resources.
 - 5.3. Should the Council decide to enforce quotas (e.g.: by systems, scientific fields, nationality, or else), these will be checked in each round. Should a quota be exhausted, the RAS will try to move it to another quota where the proposal fits (see 5.2) and there are resources available.
 - 5.4. Once all the resources have been exhausted, the RAS will prepare the list of proposals recommended for awards.
 - 5.5. PRACE MD and PRACE BoD will issue its decision based on the final recommendation of allocation of resources.

6. The recommendations from the AC and RAS will be published and made available internally to PRACE Council, SSC and IAC for their sole information.
7. The score of the individual proposal and a report from the AC will be provided to the applicants.
8. PRACE staff will send the final recommendation by the BoD to the relevant Hosting Members. Once this final recommendation is confirmed, PRACE staff will communicate it to the PIs of the proposals.
9. The recommendation of the BoD is final. However, should any applicant consider that the evaluation and scientific ranking of their proposal has not been fair, the complaint will be analysed by the BoD, and the applicant will receive the appropriate feedback.
10. PRACE Council will update the constraints and additional criteria for distribution of resources of the PRACE 2 program based on the experiences from call 14. Currently, the allocation constraints are:
 - 10.1. Out of the total node hours available in each call, Council can decide to reserve up to 10% for HLST work, urgent projects, Grand Challenges, or industrial relevance.
 - 10.2. The utilization of resources for each country is accounted for based on the country where the PI leading the proposal is active.
 - 10.3. The available capacity of Tier-0 systems is distributed 3:1 between the HM and General Partners, i.e. 75% and 25%, respectively.
 - 10.3.1. To allow fluctuations, this distribution should be fulfilled as an average for the calls in PRACE 2 by the end of 2020.
 - 10.3.2. The outcome of the Juste retour will be analysed yearly to balance the contribution of HMs and GPs and the awarded hours. Adequate measures will be considered to achieve the desired balance.
 - 10.3.3. In cases where there are not enough requests of resources to fulfil the HM or GP fraction, those resources are automatically made available to the other group for that call, but it should not alter the average distribution achieved by the end of 2020.
 - 10.3.4. The 3:1 distribution only applies to machines available in PRACE 2.
 - 10.3.5. When an allocation is shifted to a PRACE 1 machine, this allocation will not count towards the 3:1 distribution. When both types of machines work well, it is recommended to first use PRACE 1 machines.
 - 10.3.6. For the accounting of resources used by countries not contributing to PRACE, the usage will be spread over PRACE as a whole, i.e. 75% HM fraction and 25% GP fraction.

9 Changes to the Peer Review and Allocation Process

While there might arise needs to change minor implementation details or adjusting deadlines, the principles for scientific peer review and access to resources is one of the cornerstones in PRACE. The BoD can suggest changes to Council, which should include a statement from the SSC whether they support the changes. In exceptional cases where a deviation is urgently needed before the next Council meeting, this can be implemented as one-time exceptions if the SSC agrees, and the SSC member of the BoD supports the decision.

10 Summary of schedule for peer review and allocation

Time from application deadline	Administrative / formal	Technical	Scientific
Day 0 - Week 0	Application deadline Administrative assessment starts		
Day 7 - Week 1	Administrative assessment completed, including amendments	Technical assessment starts.	Scientific assessment starts.
Day 9 - Week 1			AC rapporteurs appointed. Applications made available to AC members.
Day 14 - Week 2		Initial evaluations communicated to applicants, including suggestion to alter resources requested.	Six reviewers for each proposal nominated by the AC rapporteurs.
Day 21 - Week 3		Applicant must have explained or addressed technical concerns, and possibly altered the resources requested.	External reviewers appointed. Applications made available to external reviewers.
Day 35 - Week 5		Technical assessment finished.	Technical reports made available to external reviewers and AC members.
Day 63- Week 9			External scientific reviews submitted.

Day 70- Week 10			Deadline for applicant comments on external scientific reviews. Reports and comments made available to AC members.
Day 84 - Weeks 12			AC Rapporteurs submit their reports.
Day 98 - Week 14			AC meeting.
Day 100 - Week 14	Ranked scientific prioritization from AC available to RAS.		
Day 105 - Week 15	RAS allocation recommendation to BoD, which shall take the final decision.		