

CALL NOTICE FOR ADVANCED COMPUTING PROJECTS

IN ALL SCIENTIFIC DOMAINS

Ref.: FCT/CPCA/2021/01

According to the Regulations for Advanced Computing Projects, published under No. 772-A/2020 in Diário da República (Official Portuguese Law Gazette), the allocation of computing resources of the National Network for Advanced Computing (RNCA) is carried out following a competitive tendering procedure whose terms are published on the page of the [Foundation for Science and Technology, I. P.](#) (FCT).

This Call notice, henceforth designated as AAC, was drawn up under the terms of the provisions of article 12 of the [Regulations for Advanced Computing Projects](#).

1 Objectives and priorities

The consolidation and strengthening of the National Scientific and Technological System (SCTN) are priorities of the science and technology policy made in Portugal. These priorities aim to contribute to the national and international competitiveness of science and technology, and its contribution to innovation and knowledge transfer, as well as to contribute to the achievement of global aspirations set out in the United Nations Sustainable Development Goals (ODSs). In this context, it is particularly important to promote and strengthen the skills of scientific and technological institutions through their participation in advanced computing projects.

It is with these objectives that FCT opens this [Call for Advanced Computing Projects](#) (CPCA) to technologically support advanced computing projects in all scientific domains.

FCT manages the [National Network for Advanced Computing](#) (RNCA) seeking to aggregate national advanced computing resources, promoting cooperation between the various centres involved and developing national and international partnerships with other entities.

RNCA was integrated in the National Roadmap of Research Infrastructures of Strategic Interest by Order No. 4157/2019, from the Minister of Science, Technology and Higher Education.

Keywords: RNCA, CPCA, Advanced Computing, High Performance Computing, HPC - High Performance Computing, SCC - Scientific Cloud Computing.

2 Type of beneficiaries

The institutions mentioned in Article 3 of the Regulations for Advanced Computing Projects may apply for the allocation of computing resources, individually or in co-promotion.

3 Computational models and type of projects

3.1 Computational models

This call aims at allocating computational resources to Projects in all scientific and innovation domains, with reference to international technology standards. The following computational models are available to applicants:

- a) High Performance Computing (HPC).**
- b) Scientific Cloud Computing.**

3.1.1 High Performance Computing (HPC)

For the purposes of this call, each HPC architecture is made up of the following elements:

- a) A set of compute nodes operating jointly and temporarily dedicated to a single application, which together can execute at least 40×10^{12} [¹] strongly dependent floating-point operations each second, executed on generic, non-specialised microprocessors [²].
- b) A file system accessible from each compute node at a shared rate of at least 40 Gbps [³] with multiple concurrent access streams [⁴] in each compute node.

3.1.2 Scientific Cloud Computing (SCC)

In the context of this notice, each SCC⁵ architecture is integrated by the following elements:

- a) A set of computing nodes shared by several users and applications, made available in a self-service system with maximum quotas for the use of physical resources, through a virtualisation software layer in cloud computing IaaS [⁶].
- b) The virtual servers (VM - Virtual Machines) provided will access the virtual disk through local devices, or by mounting a remote file system.

3.2 Access types

The present call includes the following access types:

- **A0 – Experimental Access**
- **A1 – Preparatory Access**
- **A2 – Project Access**

¹ 40 Tera-FLOP

² Example of a class of specialised processors are GPU

³ 1Gbps= 1 Giga bit per second

⁴ Parallel file system, like Lustre or BeeGFS

⁵ <https://www.incd.pt/?p=servicos/cloud>

⁶ See cloud IaaS definition in: <https://csrc.nist.gov/publications/detail/sp/800-145/final>.

3.2.1 A0 – Experimental Access

This type of access is recommended for scientific or innovation projects whose work team has no previous experience in HPC or SCC or has no history of using the RNCA computing resources.

This type of access is for experimentation, testing and pilot access to the platforms.

This type of access has a **maximum duration of 6 months**, extendable in duly justified and approved cases.

The total maximum limit of computational resources to be allocated is **15,000 CPU core. hours or vCPU.hours**.

The quota of resources set aside for this type of access is **5%** per RNCA platform. Should the resources for this type of access not meet the quota, the remaining part may be allocated to another type of access.

3.2.2 A1 – Preparatory Access

This type of access is recommended for *software performance testing, scalability testing, benchmarking, re-factoring⁷*, and short projects.

This type of access has a **maximum duration of 6 months**, extendable in duly justified and approved cases.

The maximum limit of computer resources to be allocated is **100,000 CPU core.hours or vCPU.hours**.

The quota of resources set aside for this type of access is **25%** per platform. If the resources for this access do not meet the quota referred to, the remaining part may be allocated to another type of access.

3.2.3 A2 – Project Access

This type of access is intended for the use of HPC and/or SCC resources and is recommended for scientific or innovation projects where the work team has previous experience in HPC or Cloud.

This type of access has a **maximum duration of 12 months**, extendable for up to **6** additional months in duly justified and approved cases.

The maximum limit of computational resources to be allocated is **3,000,000 CPU core.hours or vCPU.hours**.

For Access A2 Project with the Scientific Cloud modality, the maximum limit of resources to be allocated to each approved application is 256 GB RAM, 128 vCPU and 5 TB of disk, or less, if the capacity occasionally installed in the operational centre does not allow the maximum limits mentioned. To prove adequate scalability of access requests, the operational teams of the platforms integrated in this call may request A0 or A1 access before using A2 resources. The quota of resources reserved for this type of access is **70%** per platform. If the resources

⁷ Refactoring the computational problem according to the specific conditions where it will be executed.

requested do not meet the quota mentioned above, the remaining part may be allocated to other types of access.

Applications for this type of access shall be subject to scientific evaluation by external evaluation panels invited by FCT, I.P.

Schematic diagram of the three types of access applications (in Portuguese):



4 Form of support

The support to be granted under the present bidding procedure exclusively takes the form of allocation of time to use advanced computer resources, not granting financing of any nature, nor human resources to develop or support computer applications.

5 Computer resource endowment

The computing resources for this call for proposals are as set out in the following table and its annotations, with the FCT being able to reinforce the available resources if justified. The sum total capacity available is **31 million CPU core.hours or vCPU.hours** and **105 thousand GPU.hours**.



Operational Centre	Plataform	System	Computational models
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MACC	Bob	360 <i>compute nodes</i> , each with two Intel X86 Xeon E5-2680 (8 cores each CPU) @2.7Ghz 2GB-RAM/core. 4 GPU type Tesla T4	HPC (CPU and/or GPU)
LCA-UC	Navigator Navigator+	164 <i>compute nodes</i> , each with two Intel Xeon E5-2697v2 (12 cores each CPU) @2.7 GHz 32 <i>compute nodes</i> , each with two Intel Xeon Gold 6148 (20 cores each CPU) @2.4 GHz; 8 GPU type Tesla V100	
HPC-UE	Oblivion & Vision	68 <i>compute nodes</i> , each with two Intel Xeon Gold 6154 (18 cores each CPU)@3.0 Ghz; 8 GPU type Tesla A100	
INCD	Cirrus-A	CPU type AMD EPYC 7501, each one with 500GB-RAM and 64 cores. CPU type AMD Opteron 2356, each one with 32 GB-RAM and 8 cores CPU type AMD Opteron 2356, each one with 24 GB-RAM and 8 cores CPU type Xeon E5-2680 v3 @ 2.50GHz, each one with 200 GB-RAM and 24 cores 4 GPU type Tesla T4, each one 16GB-RAM and 2.560 cores;	
	Stratus	vCPU in AMD EPYC 7501, each one with 500GB-RAM and 64 cores	Cloud Científica

Notes:

- The computing allocations per RNCA platform will be published in the tender's fact sheet corresponding to the best projection that can be made at the time of publication of that fact sheet. These allocations may be modified due to computing projects that have, in the meantime, started their execution.
- Detailed information on available hardware and software can be found in the fact sheet of this call and on the web pages of each operational centre.

6 Eligibility criteria for projects and beneficiaries

The conditions for eligibility of applications are those indicated in Article 6 of the Regulations for Advanced Computing Projects and those indicated in this AAC.

Under access type A2, the Principal Investigator (PI) must identify a co-responsible person for the project, who will be the Co-Investigator in Charge (co-IR), and who will substitute the PI in his/her absence, absences and impediments.

6.1 Advanced Computing Project

Applications are admitted individually or in co-promotion:

- to one or two computational models (HPC, SCC)
- to one or more platforms for the same project.
- in different access types (A0, A1, A2) - see limits in point 6.2.

The eligibility of A2 access in the High-Performance Computing (HPC) model depends on the presentation of a scalability chart of the software to be used, using real or estimated data. It is also advisable to present information on previous experience, either through previous use of this model or through previous advanced computing projects (previous access A0, A1 and A2 or others, in the PRACE network for example).

The eligibility of A2 access in the Scientific Cloud Computing model for commercial and/or profit-making organisations is limited to the availability of physical computing resources after such access has been granted to non-profit-making organisations.

Regarding applications from companies as beneficiaries, advanced computing projects should:

- occur in the context of pre-competitive research and innovation, where the goods or services which are the subject of that research or innovation do not yet have a commercial value.
- not exceed, for all applications of this type together, 50% of the total computational budget to be allocated in this call.

6.2 Responsible Investigator (IR)

The Responsible Investigator (IR) of the project:

- a) Should, at the moment of application update and make available **their CienciaVitae, associated to CiêncialD**, to FCT;
- b) Is jointly responsible with the proposing institution(s), for the application, the project management, the achievement of the proposed objectives and the compliance with the rules underlying the allocation of resources.
- c) Must have, or have in the future, an employment contract, a post-doctoral scholarship, be a researcher integrated in the proponent entity or present a written agreement between the parties.

A **co-responsible for the project must be identified**, as co-responsible investigator, who will substitute the PI in his/her absence, absences, and impediments.

Applications are not eligible if the IR or co-IR has been coordinator of a project that has seriously failed, for reasons imputable to them, in the two years prior to the date of the call.

Each IR and co-IR may present a maximum of ONE application for type A2.

Each IR and co-IR may also present a maximum of ONE application for typologies A0 or A1 every 3 months, always subject to the availability of resources in these typologies.

7 Allocation of computer resources

As stipulated in article 9 of the Advanced Computing Projects Regulation, access to resources will be using computer resources from RNCA's operational centres. Access to resources will be provided for a limited period indicated in this notice, namely in points 3.2.1 and 3.2.2.

8 Evaluation criteria

In accordance with Articles 14 and 15 of the Advanced Computing Projects Regulation, all applications received will be evaluated according to the following criteria, which are densified and detailed in the evaluation guide:

Selection Criteria A0 Access type:

For A0 Access a summary technical validation will be carried out, simplifying criteria T1, T2 and T3; requests will be served on a first come first served basis until the quota defined for these accesses (5%) is exhausted.

Selection Criteria A1 Access type:

- T1: Technical suitability to RNCA resources (30%);
- T2: Computational resources planning and reasonableness (50%);
- T3: Work Plan (20%).

Selection Criteria for A2 Access type:

- T1: Technical suitability to RNCA resources (10%).
- T2: Computational resources planning and reasonableness (20%);
- T3: Work Plan (10%);
- S1: Scientific relevance which includes the proposed activity (20%);
- S2: Justification of the computational activity to support the scientific project (25%);
- S3: Scientific merit of the group and investigator in charge (5%);
- S4: Experience and training in advanced computing (10%).

Scoring is based on a quantitative scale from 0 to 10, with increments of 0.1. The final scores may be rounded to 2 decimal places.

8.1 Technical evaluation

For accesses A1 and A2, the technical evaluation of the bids (criteria T1, T2, T3) shall be performed by the technical teams operating the computing platforms (at the 4 operational centres), listed in the table in point 5 of this AAC. Each platform will generate a ranked list of bids according to the criteria defined for each access. For A1 accesses, the technical evaluation process will be sufficient to draw up a ranking of proposals. For A2 accesses, the technical evaluation will be complemented with the scientific evaluation - described in section 8.2. Formula, weights, and scores for the Preparatory Access A1:

$$\text{Final score} = ((30\% \times T1) + (50\% \times T2) + (20\% \times T3))$$

In case two or more proposals present the same value because of the application of the evaluation criteria, the oldest date and time of submission will be considered.

Gathering the technical evaluations of the technical teams of the Operational Centres, the RNCA access committee (composed of elements from the FCT and the Operational Centres as defined by the Internal Regulations, published in the DR under no. 1049/2020) will integrate and distribute the computing resources by the reserved quota of 25% of the resources for A1 accesses.

8.2 Scientific evaluation

The scientific merit of A2 applications (S1, S2, S3, S4 criteria) will be evaluated by external evaluation panels, according to the scientific sub-area of each application. There are the following panels, each of them coordinated by an element designated as such by FCT, I.P:

- **P1 – Physics and Mathematics;**
- **P2 – Chemistry and Materials;**
- **P3 - Engineering and Technology;**
- **P4 – Life and Health Sciences.**
- **P5 – Earth and Environmental Sciences;**
- **P6 – Social and Economic Sciences.**

Each application will be evaluated by 2 independent evaluators integrated in the relevant panel.

Summary of the evaluation sub-criteria (in English language according to the evaluation guide):

	A1	A2
Technical Evaluation	<i>T1 - Technical fitting to RNCA resources architecture</i> <i>T2 - Computational resources reasonability and capacity planning</i> <i>T3 - Work plan</i>	
Scientific Evaluation	N/A	<i>S1 - Relevance of the global scientific project that includes the activity proposal (Scientific merit 50% and Innovative nature 50%)</i> <i>S2 - Justification for the proposed advanced computing activity to support the global scientific project.</i> <i>S3 - Scientific credentials of the applicant research group (Scientific merit of the Responsible Investigator 50% and Research Team 50%)</i> <i>S4 - Experience and training in advanced computing*</i>

- * In cases of justified and proven absence of experience where S4<5 points, the score for criteria S1, S2 and S3 will be increased by 10%.

Formula, weights, and scores for Project A2 Accesses:

$$\text{Final Score} = (60\% \times \text{scientific_merit}) + (40\% \times \text{technical_suitability})$$

$$\text{Final Score} = ((20\% \times S1) + (25\% \times S2) + (5\% \times S3) + (10\% \times S4)) + ((10\% \times T1) + (20\% \times T2) + (10\% \times T3))$$

If two or more proposals present the same value, as a result of the application of the evaluation criteria, the one with the highest score in the criteria will be considered the best ranked: S2, followed by T2 and finally S1.

Each panel generates a ranked list of proposals A2 according to the defined criteria and weightings. Bringing together the technical evaluations of the technical teams of the Operational Centres and the scientific evaluations of the panels, the RNCA access committee (composed of elements from FCT and the Operational Centres as defined by the Internal Regulations, published in the DR under no. 1049/2020) will integrate and distribute the computational

resources by the reserved quota of 70% of the resources for A2 accesses, following the 20-40-40 principle:

- 20% of the highest scoring proposals in each panel will have recommended access to 50-100% requested resources, according to the platform preference indicated in the application and its availability.
- 40% of the following proposals will have recommended access to 50-75% of the requested resources.
- The remaining 40% of proposals will have recommended access to 5-25% according to platform availability.

9 Submission of applications

Applications are composed only by the electronic form, referred to in points 9.1 and 9.2, and its annexes. The maximum number of applications per PI or co-IR is defined in point 6.2 of this AAC.

9.1 A0 Experimental access and A1 preparatory access:

Applications must be submitted, in the English language, from **19 July 2021** (12h) until **28 April 2022** (12h), on a separate form at:

https://rnca.fccn.pt/?page_id=2251

Every 8 weeks, the applications received until then will be aggregated in batches and subject to a summary technical validation (A0) or technical assessment (A1). The allocation on the platforms will be done until the respective quotas are reached: 5% for A0 and 25% for A1.

9.2 A2 Project Access:

Applications must be submitted, in the English language, from **19 July 2021** (12h) until **13 September 2021** (12h), on the myFCT form at:

<https://myfct.fct.pt/>

>>>> Selecting "[Concurso de Projetos de Computação Avançada \(2ª edição\)](#)" or Call for Advanced Computing Projects (2nd Edition)

At the end of the deadline, applications will be subject to technical and scientific evaluation and subsequent allocation on the platforms until the respective quota limit is reached: 70% for A2 access.

9.3 Non-depletion of computational resources

If A2 access applications do not exhaust the available computing resources, FCT may set a new deadline for submission of a new batch of applications. This process may be repeated until all resources are allocated or the call is closed.

10 After approval of the applications

Each approved application will have an associated unique reference, which will be known to the PI. The formalization of the allocation of computer resources shall be made by signing a term of acceptance under the terms of article 21 of the Regulations for Advanced Computing Projects.

All publications resulting from the use of the computer resources covered by these regulations, as well as any other results, shall include reference to FCT I.P., the platform used, and the identifier assigned to the project in the support section.

In accordance with Article 24 of the Regulations, the recipients shall 1) ensure open access to the publications, namely by depositing them in one of the repositories of the RCAAP network; and 2) ensure open access to the data, in compliance with the FCT Research Data Policy, namely by preparing and maintaining the research data management and sharing plan.

FCT I.P. may publish project information, referenced as public.

The resources allocated shall be used in a regulated manner throughout the project i.e., promoting the use of at least 40% of the core.hours or vCPU.hours up to half the time of the project. This way, the platforms will be able to operate in a fair-share and queue regime.

If the Beneficiary does not start work by 2/3 of the deadline, the allocated computing resources may be reduced or suppressed.

In the event of unforeseen events, such as breakdowns, works, platform maintenance or others, users may have to suspend their work with subsequent resumption, or be relocated to another network platform, to have the least impact on the implementation of the project.

The IR and co-IR are responsible for managing the data generated, as well as the respective backup.

11 Documents and further information

This document and other relevant documents and information, namely the Regulations for Advanced Computing Projects, are available at <https://www.fct.pt/apoios/Computacao>.

Additional information and clarifications, namely on how to fill in the application form, may be requested through the email address: rnca@fccn.pt indicating "FCT/CPCA/2021/01" in the subject line. Previous reading of the call documentation is recommended, namely:

- [Regulations for Advanced Computing Projects \(in Portuguese\).](#)
- [Technical Sheet](#)
- [Application Form Guide](#)
- [Evaluation Guide](#)
- [CienciaVitae Manual.](#)
- [Panels and correspondence with scientific areas and sub-areas](#)

12 Acronyms & definitions

- “AAC” = PT: Aviso para Apresentação de Candidaturas – ENG: Call for Proposals
- “core.hora” = PT: Unidade de tempo de processamento muito usada em HPC. Número de cores de CPU ou vCPU vezes o tempo, em horas, em que eles são usados para determinada função – ENG: Unit of processing time widely used in HPC. Number of CPU colours or vCPU times the time, in hours, that they are used for a given function.
- “HPC” = PT: Computação de Alto Desempenho – ENG: High Performance Computing
- “HPC-UE” = High Performance Computing - Universidade de Évora (PT: Centro operacional que gere a plataforma Oblivion e Vision); (ENG: Operational centre running the Oblivion and Vision platform)
- “INCD” = PT: Infraestrutura Nacional de Computação Distribuída – ENG: National Distributed Computing Infrastructure
- “IP” = PT: Instituição Proponente – ENG: Proposing Institution
- “IR” = Investigador Responsável – ENG: Researcher Responsible
- “LCA-UC” = PT: Laboratório de Computação Avançada da Universidade de Coimbra – ENG: Advanced Computing Laboratory of the University of Coimbra
- “MACC” = Minho Advanced Computing Center
- “PRACE” = Partnership for Advanced Computing in Europe
- “SCC” = Scientific Cloud Computing
- “vCPU” = PT: CPU que é visível dentro de uma VM. Normalmente corresponde a um core de CPU do servidor *host* da VM. ENG: CPU that is visible inside a VM. Typically corresponds to a CPU core of the VM host server.
- “vCPU.hora” = PT: número de virtual CPU vezes o tempo, em horas, em que eles são usados para determinada função. ENG: number of virtual CPUs times the time, in hours, that they are used for a given function.
- “VM” = PT: Servidor Virtual – ENG: *Virtual Machine*

