

## CALL FOR GRANT APPLICATIONS (AE2024-0085)

INESC TEC is now accepting grant applications to award 1 Research Grant (BI) within the scope of the ATE funded by IAPMEI with reference 56 Co-financed by Component 5 - Capitalization and Business Innovation, integrated in the Resilience Dimension of the Recovery and Resilience Plan within the scope of the Recovery and Resilience Mechanism (MRR) of the European Union (EU), framed in the Next Generation EU, for the period 2021 - 2026.

### 1. GRANT DESCRIPTION

**Type of grant:** Research Grant (BI)

**General scientific area:** COMPUTER SCIENCE

**Scientific subarea:** Computer Systems

**Area of Work:** Distributed Systems

**Grant duration:** 6 months, starting on 2024-04-01, with the possibility of being renewed until the end of the project.

**Scientific advisor:** Ricardo Gonçalves Macedo

**Workplace:** INESC TEC, Braga , Portugal

**Maintenance stipend:** € 990,98, [according to the table of monthly maintenance stipend for FCT grants](#) , paid via bank transfer. Grant holders may be awarded potential supplements, according to a quarterly evaluation process (Articles 19, 21 and 22 of the [Regulations for Grants of INESC TEC](#) and Annex II), up to a maximum limit of 50% of the monthly maintenance stipend.

INESC TEC supports costs with registration, enrolment or tuition fees, during the grant duration, under the terms established in the internal document: "[Payment of Tuition fees to grant holders](#)".

The grant holder will benefit from health insurance, supported by INESC TEC.

### 2. OBJECTIVES:

This grant is part of the "Alliance for Energy Transition" project, which will design a multi-tenant platform based on cloud technologies that will serve as an integrator for services with data from various domains in an interoperable way and be simple to instantiate for stakeholders in the energy value chain.

This grant has the main goal of researching and developing a new generation of energy consumption monitoring tools in modern operating systems to assess the energy efficiency of key-value store systems. In more detail, the proposed tool should be able to evaluate and measure the energy consumption of multiple key-value stores (e.g., RocksDB, PebblesDB, LevelDB) through dynamic instrumentation, accounting with different computational resources (namely, CPU, memory, and disk). Finally, the monitoring tool will allow the study of the energy impact of key-value stores and their current optimizations.

### 3. BRIEF PRESENTATION OF THE WORK PROGRAMME AND TRAINING:

- Prototype implementation of an energy consumption monitoring tool through toolkits available at modern, Linux-based operating systems (e.g., Intel RAPL, /proc file system);
- Experimental evaluation of the developed prototype by measuring the energy consumption of different key value stores;
- Study of the energy impact of several key-value stores and of their current performance optimizations.

The tasks described in this working plan demand the application and development of concepts and techniques in the area of Software Engineering which are usually introduced in curricular units included in the curricula of the Mestrados Integrados em Engenharia Informática or Mestrado em Engenharia Informática studies.

#### 4. REQUIRED PROFILE:

##### Admission requirements:

- BSc Degree in Informatics Engineering Sciences.
- The awarding of the fellowship is dependent on the applicants' enrolment in study cycle or non-award courses of Higher Education Institutions.

##### Preference factors:

- Experience on the design and development of energy monitoring frameworks;
- Experience on measuring and analyzing the energy impact incurred over different computational resources;
- Experience with the C++ programming language.

##### Minimum requirements:

- Solid knowledge on energy monitoring systems and corresponding mechanisms (e.g., PowerJoular, RAPL, /proc file system);
- Solid knowledge on modern key-value stores and corresponding performance optimizations (i.e., RocksDB, LevelDB, PebblesDB);
- Knowledge on benchmarking platforms for evaluating key-value stores performance (i.e., YCSB, db\_bench);
- Solid knowledge on operating systems.

#### 5. EVALUATION OF APPLICATIONS AND SELECTION PROCESS:

**Selection criteria and corresponding valuation:** the first phase comprises the Academic Evaluation (AC), based on the criteria referred to in Article 12 of the [Regulations for Grants of INESC TEC](#), while the second phase comprehends the Individual Interview (EI). All factors are evaluated on a scale of 0 to 100, taking into account the applicants' merit, suitability and conformity with the preference factors.

The weight of the AC factors are as follows: Academic Qualifications (FA, 70%), Scientific Publications (PC, 10%), Experience (EX, 10%) and Motivation Letter (CM, 10%).

Candidates who score less than 50 points in the AC average will be considered excluded on absolute merit. The top five candidates approved on absolute merit will be qualified for the individual interview. The Final Grade (CF) is obtained by the weighted average of AC (80%) and EI (20%).

##### DISABILITY INCENTIVE

Candidates who present a degree of disability equal to or greater than 90% will benefit from an incentive (20) in the score of the CV Assessment.

Candidates who present a degree of disability equal to or greater than 60% and less than 90% will also benefit from an incentive (10) in the score of the CV Assessment.

Said score may, in these cases, exceed 100 points.

Candidates must demonstrate the degree of disability during the application, namely through the submission of the Multi-Purpose Medical Certificate of Disability, issued in accordance with Decree-Law no. 202/96, of October 23 - currently in effect.

Candidates must declare, in the application form, the type of disability used throughout the selection process, in order to proceed with the required adaptations.

##### The Selection Jury is composed of the following members:

President of the Jury: Ricardo Gonçalves Macedo

Full member: João Tiago Paulo

Full member: Fábio André Coelho

Substitute member: José Orlando Pereira

**Release of results and prior hearing:** the results of the selection process, as well as the terms and procedures for prior hearing, will be released to the applicants by email, under the terms referred to in Article 13 of the Regulations for Studentships and Fellowships of INESC TEC.

#### 6. FORMALISATION OF APPLICATIONS:

### Application Documents:

1. Motivation letter;
2. Curriculum Vitae (must include the list of previous fellowships, their type, beginning and end dates, funding entities and host institutions);
3. Certificate or diploma degree;
4. Proof of enrollment in a degree awarding study cycle or in a non degree awarding Higher Education program.
  - The proof of enrollment may be presented just during the grant hiring stage.
5. Signed declaration stating the infringement of the grant holder's duties (article 14, no. 4)
6. Documental evidence to support the country of residence, residence permit or other legally equivalent document, in cases where the applicant is a foreigner or non-resident in Portugal - valid until the beginning of the grant.
7. Other supporting documents relevant to the final assessment.

Failure to deliver the required documents within the 90-day period after the date of the notice of the conditional awarding of the grant implies its cancellation.

**Application period:** From 2024-02-29 to 2024-03-13

**Submission of applications:** the application will be formalised by submitting the form available in the *Work With Us* section of INESC TEC website.

### 7. BINDING LEGISLATION AND REGULATION

The hiring process shall comply with the current legislation regarding the Research Grant Holder Statute, approved by Law no. 40/2004 of August 18, in its current wording, as well as by the [Regulations for Grants of INESC TEC](#) and for [FCT Grants Regulation in force](#).

For more information, please check the [Regulations for Grants of INESC TEC](#) and relevant annexes at [www.inesctec.pt/bolsas](http://www.inesctec.pt/bolsas)

