

Annex 1

to the Call for Expression of Interest for the selection of a Hosting Entity for a High-End Supercomputer

**APPLICATION FORM**

**Call REF: EUROHPC-2021-CEI-EXA-01**

Application Ref: [***ACRONYM***]

***IMPORTANT NOTICE***

*Applicants must use this template for their applications (designed to highlight important aspects and facilitate the assessment against the evaluation criteria).*

***Character*** *and* ***page limits****:*

* *page limit: 90 pages*
* *minimum font size — Arial 8 points*
* *page size: A4*
* *margins (top, bottom, left and right): at least 15 mm (not including headers & footers).*
* *pagination instructions: each document from the application must be individually numbered in the bottom right corner.*

*Please abide by the formatting rules. They are not a target! Keep your text as concise as possible. Do not use hyperlinks to show information that is an essential part of your project.*

*Please include in the header (top left) of each page the Acronym of the Application.*

*Before filling in this form, please read carefully the relevant call for Expression of Interest, and any other reference documents related to this call available on our site https://eurohpc-ju.europa.eu/current-calls*

*Please make sure that your application:*

* *is submitted on the correct form, completed in full and dated;*
* *is signed by the person authorised to enter into legally binding commitments on behalf of the applicant;*
* *meets the submission arrangements set out in the call;*
* *is submitted by the deadline.*

*Applicants may be requested to provide additional information or to clarify the supporting documents submitted in connection with the application, provided that such information or clarification does not substantially change the proposal.*

* Paragraphs in italics or boxes with paragraphs in italics are intended as an explanatory guidance for the applicant and shall be deleted before bidding.*

* Don’t forget to delete this page and explanatory text in italics.*

|  |  |
| --- | --- |
| **PROGRAMME CONCERNED** | |
| **EuroHPC HIGH-END Supercomputer** | |
| **REFERENCE NUMBER OF THE CALL** | |
| Call for Expression of Interest for Hosting the EuroHPC JU Supercomputer EUROHPC-2021-CEI-EXA-01 | |
| **SUMMARY OF THE APPLICATION** | |
| Title: | |
| Identity of the Coordinator/Applicant: | |
| Consortium: *YES/NO* | |
| Coordinator:  *Partner1*: | Contribution Coordinator: XXX *Euro*  Contribution *partner1*: XXX *Euro* |
| Summary of the Application:(*in EN, max 1000 words)* | |
| Would the hosting consortium be ready to include additional Participating States if selected? *YES/NO*  If YES, please include the indicative amounts of the contribution of the additional Participating States: | |

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# I. INFORMATION ON THE APPLICANTS

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| **1 REFERENCES OF THE APPLICANTS** |

1.1 (*Option 1: Applicant No1 — or Option 2: Coordinator;* *please indicate what is applicable*):

|  |
| --- |
| **1.1.1 IDENTITY OF THE APPLICANT** |
| Official name in full: |
| Acronym:  (if applicable) |
| Official legal form: |
| Legal personality[[1]](#footnote-2): |
| Place of establishment or registration:  (Address and country) |
| Entity registration number:  (Not applicable if the applicant is a public-sector body.) |
| VAT number (if applicable): |

The legal details are attached in the Legal Entity Form[[2]](#footnote-3) to be provided as annex. Any changes in the legal entity form must be notified in writing to the Executive Director.

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| --- |
| **1.1.2 CONTACT DETAILS** |
| Street address: |
| Postcode: |
| City: |
| Region (if applicable): |
| Country: |
| Telephone: Mobile: |
| Fax: |
| E-mail address: |
| Website: |

Any change in the addresses, phone numbers, fax numbers or e-mail, must be notified in writing to the Executive Director. The Executive Director will not be held responsible in the event that it cannot contact an applicant**.**

|  |
| --- |
| **1.1.3 CONTACT PERSON RESPONSIBLE FOR THE Expression of Interest** |
| Family name: First Name: |
| Position/Function: |
| Telephone: Mobile: |
| Fax: |
| E-mail address: |
| **1.1.4 LEGAL REPRESENTATIVE (PERSON AUTHORISED TO SIGN THE HOSTING AGREEMENT)** |
| Family name: First Name: |
| Position/Function/Mandate: |
| Telephone: Mobile: |
| Fax: |
| E-mail address: |

1.2 Applicant No 2 (If applicable, repeat this part as often as is required to include all applicants)*.*

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| --- |
| **1.2.1 IDENTITY OF THE APPLICANT** |
| Official name in full: |
| Acronym:  (if applicable) |
| Official legal form: |
| Legal personality[[3]](#footnote-4): |
| Place of establishment or registration:  (Address and country) |
| Entity registration number:  (Not applicable if the applicant is a public-sector body.) |
| VAT number (if applicable): |

The legal details are attached in the Legal Entity Form[[4]](#footnote-5) to be provided as annex. Any changes in the legal entity form must be notified in writing to the Executive Director.

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| --- |
| **1.2.2 CONTACT DETAILS** |
| Street address: |
| Postcode: |
| City: |
| Region (if applicable): |
| Country: |
| Telephone: Mobile: |
| Fax: |
| E-mail address: |
| Website: |

Any change in the addresses, phone numbers, fax numbers or e-mail, must be notified in writing to the Executive Director. The Executive Director will not be held responsible in the event that it cannot contact an applicant**.**

|  |
| --- |
| **1.2.3 CONTACT PERSON RESPONSIBLE FOR THE APPLICATION** |
| Family name: First Name: |
| Position/Function: |
| Telephone: Mobile: |
| Fax: |
| E-mail address: |

# III. INFORMATION ON THE EXPRESSION OF INTEREST

## III.I General System specifications

*Applicants must describe how the following general system specifications will be met, for both the high-end supercomputer and the site.*

*The hosting entity will host a supercomputer with the following requirements:*

* *A capability computing system with an aggregated performance level capable of executing at least 1 Exaflop (sustained performance measured using Linpack benchmark)*
* *Covering the needs (including substantial performance increase) of a wide range of applications, and in particular of key/grand challenge applications that demonstrably require the capability usage of the supercomputer, i.e. using simultaneously a large part of the resources of the system.*

*The hosting site should comply with at least the following requirements:*

* *Power capacity and power quality for hosting a system in the range of 20 to 25 MW total consumption for the exascale supercomputer*
* *UPS power available to cover the critical systems including storage and access to data of the JU system.*
* *Adequate capacity of air or liquid cooling for hosting the JU system*
* *At least 700 m² of contiguous floor space available for hosting the high-end supercomputer and auxiliary systems*
* *Raised floor able to bear at least 2200 kg/m² distributed load*
* *At least 100 Gbit/s connectivity towards the rest of the GEANT Network (link capacity)*
* *Hosting physical security*
* *Hosting fire mitigation equipment/procedures*
* *Hosting IT access security*
* *Ability to perform at least a Level 1 measurement quality for a Top500 submission*
* *On call service support teams for IT issues*
* *Dedicated on-call service team for facilities issues*
* *Regularly measure the satisfaction of the users with the service via a user survey*

*Applications must include a description of the proposed supercomputer and hosting site, including features such as:*

* *Detailed description of the site hosting the system*
* *Description of the main features of the targeted supercomputer system, including e.g.:*
  + *Type of nodes and their configuration (e.g. accelerated, CPU, High memory, etc.)*
  + *Memory and storage capacities and architecture*
  + *Ratio of different node types within the system (accelerator/CPU, memory size,...)*
* *Expected sustained performance (Linpack and other performance indicators)*
* *What type of application domains (e.g. computational, HPDA, AI …) and specific applications (e.g. weather forecasting, climate change, new materials, drugs design, …) will the system be optimised for? What are the expected performance increases for the targeted applications?*
* *Acceptance tests and benchmarks to be used for the acceptance of the high-end supercomputer*
* *Other related software/services (containers, virtualisation, support of workflows, workflow management…)*

### *Optional: Description and evaluation of an optional proposal system targeting the development of an advanced experimental platform towards exascale systems*

*One of the targets of EuroHPC Joint Undertaking is also promoting the further development of European technologies and their subsequent integration in exascale supercomputing systems and thus contributing to developing a competitive European technology supply industry.*

*As part of this objective, it is proposed that interested hosting entities may also include in their proposal an optional system targeting the development of an advanced experimental platform towards exascale systems. The goal of such a platform shall be to develop an exploratory supercomputing infrastructure for the development, integration, testing, and co-design of a wide range of European technologies suitable to be part of the future European exascale systems. The development, installation and operating costs of such platform should be marginal to the overall cost of the proposal.*

*In case the hosting entity decides to include such optional part in their proposal, the hosting entity should include a description of such platform, the development targets (milestones) and the time plan as well as a detailed work plan and the cost breakdown for its development and operation. The potential of such platform towards exascale systems should be duly justified in the proposal and will be evaluated for its own merits for receiving or not financial support. This evaluation shall not affect the overall evaluation of the mandatory part of the proposal.*

*In case the hosting entity decides to include such optional system in their proposal and is selected, the grant that will be established to cover the operating costs of the high-end supercomputer, will also include a part cover up to 50% of the eligible costs for the development of the advanced experimental platform towards exascale. The maximum costs for such platform should not exceed 6% of the overall TCO of the high-end supercomputer.*

## III.2 Total Cost of Ownership (TCO)

*The applicant should include an estimation of the cost of the supercomputer that the applicant has in mind to host and that has been described in the previous section “general system specifications”.*

*The estimation of the TCO will be based on an estimation of the acquisition costs of a potential system that complies with the general system specifications and on an estimation of its operating costs. The costs related to the construction of the hosting site per se (i.e., the costs related to the building infrastructure that will host the high-end supercomputer, etc.) shall not be covered by the EuroHPC JU. The costs of the preparation and adaptation of the hosting site incurred by the hosting entity that can be directly accounted to the high-end Supercomputer may be considered as part of the TCO.*

*Applicants must provide their intention with regards to the duration of the operations of the high-end supercomputer in the hosting entity. This should include not only their proposal for the duration of the operations, but their preference with the ownership of the Supercomputer once the operations are finished (e.g. buy it, decommissioning it …).*

### III.2.1 Site Preparation

*The hosting entity must be able to meet the baseline requirements set out herein in time for the anticipated timeline for the delivery of the machine in June 2023. The applicant must provide a plan of how and in what timeline intends to realise the construction of a new or the upgrade of an existing site, including costs of each action (indicating the ones that will be considered as in-kind contribution) and the definitive date at which the site will be ready for the installation of the EuroHPC system.*

### III.2.2 Acquisition Costs

*Applicants must detail the estimation for the cost of the acquisition of the high-end supercomputer. Applicants must indicate clearly what costs will be included in this category, how they will calculate them and who will pay for those.*

### III.2.3 Operating Costs

*Applicants must provide an auditable methodology to calculate and to verify the operating costs of the supercomputer for the duration of the action. Applicants must describe the model that will be used for calculating the costs of the Operational expenditures (OPEX), detailing the cost elements included in the model and providing estimates for each cost.*

*The hosting entity should be in position to provide an accurate estimate and to verify the operating costs of the high-end supercomputer, by ensuring, for example, the functional separation, and to the extent possible, the physical separation of the high-end supercomputers and any national or regional supercomputing systems it operates. The applicants must explain the way the high-end supercomputer shares its IT environment and storage.*

*The method should be used operating grant to calculate the operating costs and the amount that will be covered by Union's contribution. Applicants can use the indicative list of cost elements provided in Appendix 2 to consider in the calculation of the operating costs.*

*Applications must include at least the following information and or estimations:*

* *Average power usage effectiveness (PUE) for the current data centre over the last 12 months[[5]](#footnote-6). And, in the case that the applicant would be upgrading the site to host the high-end supercomputer, what is the planned (design specification) PUE for your upgraded data centre[[6]](#footnote-7).*
* *Depreciation time for the building, technical building infrastructure and IT investments and method used for the depreciation of the assets (e.g. linear).*
* *Average cost of IT on-call service (24/7) (internal or outsourced) over the last 12 months.*
* *Current electricity price in EUR/kWh (all taxes included) and if available, electricity price in EUR/kWh (all taxes included) at the expected installation time of the high-end supercomputer.*
* *Number of system administrators (FTE) expected to dedicate to the running of the high-end supercomputer service (including critical auxiliary services such as storage, scheduling system, etc.), including average Person Month cost.*
* *Number of user support staff (FTE) expected to dedicate to the running of the users of the high-end supercomputer and application support including average Person Month cost.*
* *Number of technical support staff (FTE) expected to dedicate for an Application Support Team including average Person Month cost.*
* *IT environment including storage (disks, tapes ...) architecture, capacities and their ability to be extended to serve a high-end supercomputer.*

## III.3 Experience of the hosting entity in installing and operating similar systems

*Applicants must provide information of their experience in installing and operating supercomputers and dedicated high performance storage facilities, including at least:*

* *Previous experience with installing and operating supercomputers. Provide information in case the applicant’s site has experience in hosting very early releases of new systems. If relevant, applicants must provide documentation of their experience in having installed systems in the last 5 years (especially systems that ranked in the top 50 positions of the Top500 at the time of their first listing).*
* *In the case of installing and operating a supercomputer for a 3rd party (supercomputer is legal title of 3rd party and operated for them at agreed SLA) or operating a supercomputing service or equivalent major infrastructure for a 3rd party (3rd party pays for a service with agreed SLA, supercomputer is the legal title of the hosting site); applicants must provide a description of the service provided as well as at least one contact person from the 3rd party from whom the JU may request a reference for this service.*
* *Description of the current organizational structure and the teams of people responsible for the supercomputer operation and management (including user support and specialist support of the HPC systems). If available, include current procedures and tools for system management, help desk project management, configuration management, training and education put in place.*
* *Description of the current procedures adopted by the supercomputing operation and management team to monitor HPC systems. Please indicate which of these are these are in-house and which are 3rd party solutions; how they have been integrated and customized. List any current Quality Control certifications your organization has obtained for system management, help desk project management, configuration management, training and education.*
* *Description of the current procedures adopted by the supercomputing operation and management team to trace and resolve issues and communicate them to users and other stakeholders. Include description of current procedures adopted by the supercomputing operation and management team to ensure that service level agreements are met.*
* *Description of any current continuity procedures the operations team or the Network Operations Center (NOC) has in place and description of current workload management software and methodology (bonus/malus; backfill; etc.) in place.*
* *Description of previous experience in providing supercomputer access and other related services to users from other member states or pan European environments (e.g. PRACE)*

## III.4 Quality of the hosting facility's physical and IT infrastructure, its security and its connectivity with the rest of the Union

*Applicants must provide information of the hosting physical and IT infrastructure, including security and connectivity that the site can provide for the high-end supercomputer.*

*For the site preparation, the hosting entity must be able to meet the baseline requirements set out herein in time for the anticipated timeline for the delivery of the high-end supercomputer by mid-2023 and the operations by the last quarter of 2023. The applicants must provide a plan of how and in what timeline they intend to realise the upgrade of the site, including the definitive date at which the site will be ready for the installation of the high-end supercomputer. This may include, but is not limited to Gantt charts, contractual timelines, construction permits and work contracts status.*

*Applicants should include (at least) the following information related to the current and proposed capacities of the hosting facility and how to achieve them:*

* *Description of the intended hosting entity site and facility, including cooling methods and experience on cooling systems, power measurement facilities, accessibility, possibility to accommodate visitors, courses, possible extendibility of the site (m² and KW) and description of physical security concept, including access control, CCTV, etc.*
* *Power measurement facilities in place an infrastructure level and where (device type, location of measurement at rack, pdu, centre) and maximum levels of energy measurement according to the EE HPC Power Measurement Methodology. If available, reference to any memberships of energy efficiency interest groups or codes of conduct (e.g. EE HPC WG , EU Code of Conduct, EMAS, or other); certifications for energy efficiency and sustainability (e.g. ISO / IEC 13273).*
* *Information about the connection to the power grid, including maximum capacity of connection to the power grid and other characteristics such as redundant connection to the power grid. Information about power grid quality (number of outages from supplier in last 48 months, starting January 1st 2018) and energy procurement method (e.g., long-term contracts, annual market based purchases, other).*
* *Information about availability of the data centre: expressed as a minimum percentage of uptime or in maximum number of hour’s downtime that the hosting entity deem are acceptable per year. Average availability of data centre infrastructure (cooling, power, etc.) (over the last 24 months for current)[[7]](#footnote-8).*
* *Information about connectivity towards the rest of the GEANT Network (link capacity) and the Network Operating Centre (NOC) and its reachability (e.g. 24/7).*
* *Facility managers (in-house or outsourced) involved in ensuring the operation of the data centre, and their specialization.*
* *Total memory and storage capacities of the centre, defining what part would be dedicated to the high-end supercomputer.*

## III.5 Quality of service to the users, namely capability to comply with the service level agreement

*The applicant should specify the benchmarks or deliverables which the applicant intends to employ to achieve the expected results and targets and how they will be used. These should include at least the SLAs in the Hosting Agreement and information related to:*

* *Access time accounting model that will be used to control the allocation time of the supercomputer. Description of access time policy proposed and how the total number of nodes of jobs in waiting queue ready to run will be measured. Provide historic system uptake and usage for recent HPC systems.*
* *Availability of main HPC systems over last 12 months if the system has been operational for at least 18 months. If the system has been operational for less, please provide availability numbers based on the duration for which the system has been in full production. This should include hours of scheduled maintenance and hours of unscheduled maintenance.*
* *Availability of help-desk; number of active projects currently supported. Description of services provided by user support (e.g. 1st level, 2nd level, application support) and of policy regarding response times for level 1, 2 and 3 tickets[[8]](#footnote-9).*
* *Overview of training course curriculum related to HPC and scientific computing and links towards user documentation pages, user tutorials and webinars[[9]](#footnote-10).*
* *Description of how the on-call service (24/7) for the supercomputing service and infrastructure facilities are set up and work. Include, if available, results from the user satisfaction surveys for your site for the last 5 years.*
* *Fraction of time for which the current supercomputing service (supercomputer + all necessary auxiliary services like storage, network, login nodes, etc. + main software services like scheduler, access to file systems, etc.) has been available over the last 12 months[[10]](#footnote-11)?*
* *Do you perform regular regression tests to assess the stability of performance of your current supercomputer service? If yes, please provide a description of the regression test used and the frequency at which it is run.*
* *Does your site provide any additional services that may not be critical to running the supercomputing service but may provide an additional benefit to the end user? If yes, please provide a description of these services*

*Applicants must provide details on how these tasks are currently done and how they propose to achieve them for the hosting of the high-end supercomputer. Applicants must indicate subcontracted action tasks (if any) and explain the reasons why (as opposed to direct implementation).*

By submitting an application the applicant accepts that in case of award certain data like the name, locality and amount (amongst others) will be published.

By submitting an application, the applicant and participants of the hosting consortium accept the terms and conditions set out in the call for expression of interest and the model hosting agreement to be found in Annex 2 of the call for expression of interest.

|  |
| --- |
| I declare that all information provided in this application form and its annexes is correct.  Date: Signature of the legal representative  of the coordinator organisation |

# CHECKLIST FOR APPLICANTS

*Please use this checklist to ensure that you attach all of the necessary documents*

|  |  |  |
| --- | --- | --- |
| **Document and content** | **Coordinator** | **Partner** |
| All sections of the application form have been filled in, where appropriate, in accordance with the Call for Expression of Interest or any other document provided as guidance related to the programme concerned. |  | N/A |
| Provision of an appropriate supporting document proving the commitment of the Member State where the hosting entity is established or of the competent authorities of the Participating States of the hosting consortium to cover the share of the total cost of ownership of the pre-exascale supercomputer that is not covered by the Union contribution. |  |  |
| The declaration(s) on honour has (have) been signed and attached in original (see template in Annex a) |  |  |
| Legal details have been included in the Legal Entity Form annexed.  <http://ec.europa.eu/budget/contracts_grants/info_contracts/legal_entities/legal-entities_en.cfm> |  | N/A |
| Mandate letters have been signed and attached in original (if applicable; see template in Annex b) | N/A |  |

1. Legal personality is understood as applicant’s capacity to sign contracts and constitute a party in court proceedings under the applicable national legislation. [↑](#footnote-ref-2)
2. <http://ec.europa.eu/budget/contracts_grants/info_contracts/legal_entities/legal-entities_en.cfm> [↑](#footnote-ref-3)
3. Legal personality is understood as applicant’s capacity to sign contracts and constitute a party in court proceedings under the applicable national legislation. [↑](#footnote-ref-4)
4. <http://ec.europa.eu/budget/contracts_grants/info_contracts/legal_entities/legal-entities_en.cfm> [↑](#footnote-ref-5)
5. The calculation of the PUE provided must be based on the method defined by ASHRAE Technical Committee 9.9 as set out in their publication “PUE: A Comprehensive Examination of the Metric”. PUE = Total Facility Energy / IT Equipment Energy (Note: JU reserves the right to check this value.) [↑](#footnote-ref-6)
6. The estimated of the PUE provided must be based on the method defined by ASHRAE Technical Committee 9.9 as set out in their publication “PUE: A Comprehensive Examination of the Metric”. PUE = Total Facility Energy / IT Equipment Energy [↑](#footnote-ref-7)
7. Facility is deemed available when no facility issues are affecting the running of the supercomputing service. Availability = total hours – (scheduled + unscheduled downtime) [↑](#footnote-ref-8)
8. Level 1 => simple request, can be solved in 1 day; Level 2 => more complex request, requires some research, can take up to 5 working days to resolve, Level 3 => request that requires vendor response to resolve, may take longer than 5 working days [↑](#footnote-ref-9)
9. or provide electronic copies if these are not reachable online or without a user account [↑](#footnote-ref-10)
10. Available = fully up and running and reachable by the users and at least 98% of compute nodes available [↑](#footnote-ref-11)