



EuroHPC JOINT UNDERTAKING
DECISION OF THE GOVERNING BOARD OF THE EuroHPC JOINT
UNDERTAKING No 02/2020

Adopting the launch of the call H2020-JTI-EuroHPC-2020-1:
Advanced pilots towards the European exascale supercomputers

THE GOVERNING BOARD OF THE EuroHPC JOINT UNDERTAKING,

Having regard to Council Regulation (EU) 2018/1488 of 28 September 2018 establishing the European High Performance Computing (EuroHPC) Joint Undertaking (hereinafter "Regulation")¹,

Having regard to the Statutes the EuroHPC Joint Undertaking annexed to the Regulation (thereinafter "Statutes") and in particular to Articles 1(o), 7 (4) (b), 7 (5) (b) and 18 of thereof,

Having regard to the Governing Board Decision No 01/2020 of 10 March 2020 adopting the amended EuroHPC Joint Undertaking Work Plan for the year 2020,

WHEREAS

- (1) The amended annual Work Plan of the EuroHPC Joint Undertaking for the year 2020, has been adopted by the Governing Board by its Decision No 01/2020 of 10 March 2020.
- (2) The Governing Board should approve the launch of Calls for Proposals, in accordance with the annual work plan.
- (3) The Executive Director of the EuroHPC Joint Undertaking should manage the calls for proposals as provided for in the annual work plan and administer the grant agreements and decisions;

¹ OJ L 252, 08.10.2018, p. 1-34

HAS ADOPTED THIS DECISION:

Article 1

The Governing Board hereby approves the launch of Calls for Proposals H2020-JTI-EuroHPC-2020-1 (RIA), in accordance with the annual Work Plan of the EuroHPC Joint Undertaking for the year 2020, as amended by Governing Board Decision No 01/2020 of 10 March 2020.

Article 2

The Executive Director of the EuroHPC Joint Undertaking is hereby instructed to launch the EuroHPC call for proposals H2020-JTI-EuroHPC-2020-1 (RIA), further to the adoption of and in accordance with the annual Work Plan of the EuroHPC Joint Undertaking for the year 2020, as amended by Governing Board Decision No 01/2020 of 10 March 2020.

Article 3

The Call for Proposals shall be published at least:

- on the website of the EuroHPC Joint Undertaking;
- on the H2020 single portal for participants (Funding and Tenders Opportunity Portal).

Article 4

This Decision shall enter into force on the date of its adoption

Done at Luxembourg, on 31 March 2020.

For the Governing Board

Herbert Zeisel

The Chair

Annex: Call text and conditions for the call ‘Advanced pilots towards the European exascale supercomputers’ - H2020-JTI-EuroHPC-2020-1

Annex:

EuroHPC Joint Undertaking Call for Proposals
Advanced pilots towards the European exascale supercomputers
H2020-JTI-EuroHPC-2020-1

NOTICE

For UK applicants: Please be aware that following the entry into force of the EU-UK Withdrawal Agreement¹ on 1 February 2020 and in particular Articles 127(6), 137 and 138, the references to natural or legal persons residing or established in a Member State of the European Union are to be understood as including natural or legal persons residing or established in the United Kingdom. UK residents and entities are therefore eligible to participate under this call.



In accordance with the Statutes of the EuroHPC JU annexed to Council Regulation (EU) 2018/1488 and with the Financial Rules of the EuroHPC JU.

The call text will be made publicly available after its adoption by the Governing Board.

¹ Agreement on the withdrawal of the United Kingdom of Great Britain and Northern Ireland from the European Union and the European Atomic Energy Community

CALL H2020-JTI-EUROHPC-2020-1 - ADVANCED PILOTS TOWARDS THE EUROPEAN EXASCALE SUPERCOMPUTERS

The support for a sustainable extreme-scale HPC ecosystem in Europe requires mastering the R&D process with a co-design approach and a holistic view on the technology supply, hardware, software stack and applications. The overall goal is to demonstrate the successful integration of European technologies in future European exascale and extreme performance computing capabilities addressing scientific, industrial or societal challenges.

Proposals are invited against the following topics:

EuroHPC-2020-01-a: Advanced pilots towards the European supercomputers

The EuroHPC JU will continue in 2020 the efforts to complete the European supply value chain with a Call for the integration of European technological building blocks into advanced pilot supercomputing systems aiming at exascale performance with a co-design approach. This is a necessary step to refine and customise the integrated hardware and software architectures to fit the needs of key relevant applications and to determine the necessary technical trade-offs in system design. Pilot systems should demonstrate a reliable proof of concept of EU technologies, notably proving the capability of scaling up and of providing energy-efficient solutions to realise the future European exascale supercomputers.

Specific Challenge: To demonstrate in pre-operational environments the successful integration of European technology building blocks developed for example in the European Processor Initiative (EPI) and in previously funded EU R&I actions into fully integrated pilot supercomputing systems commensurate with exascale performance objectives along with other European IP such as software tools and application libraries, interconnects, rack design, cooling systems, advanced fabric management, etc... The goal of these pilot supercomputing systems will be to produce a prototype system which can be used in a pre-operational environment, able to execute jobs and run software components designed as part of the pilot programme.

Two such pilot supercomputing systems will be supported whose work will be closely inter-coordinated. They will have to demonstrate how the challenges of power efficiency, usability, resiliency and scalability can be met, by considering in particular a strong co-design approach driven by ambitious application requirements. The involved stakeholders should include technology component suppliers, system integrators, supercomputing infrastructure providers and user communities.

Scope: Proposals are expected to address the European research, technology building blocks integration, system co-design, validation and experimentation of advanced supercomputing pilot systems aiming at exascale performance, driven by a set of ambitious extreme data and HPC application and power-efficiency requirements.

The approaches should ensure that they contribute to the realisation of future exascale system architectures based on European low-power processing technologies, such as those developed for example in the EPI initiative. Each proposal should aim at realising one supercomputing pilot system. Pilot systems should maximise the integration of European hardware and software technologies, and foster, to the extent possible, the development of solutions based on European open hardware and open-source software.

Two complementary pilot supercomputing systems are expected to be supported, based on the European Processor Initiative (EPI) and/or other previously funded EU R&I actions:

- One leveraging the efforts on European low power general purpose processing technologies
- A complementary one leveraging the efforts on European open hardware solutions (e.g. an agnostic HPC system able to embed, cool and manage existing components and future ones, such as accelerator technologies based on RISC-V or other components that can simulate the behaviour of future European components)

The proposals should address all the following points:

- Description of the supercomputing pilot system, with architectural features and measurable objectives that demonstrate the relevance and potential of the pilot system as a meaningful step towards the realisation of future operational European exascale systems. The description of the pilot should address amongst other: targeted number of computing elements, interconnects and network topologies for exascale, cooling, I/O, etc.
- Definition of clear and measurable intermediate and final targets to demonstrate the suitability of the pilot system, for example in terms of system performance, performance improvements for the selected applications, power budget and efficiency, scalability, resilience, etc. The proposal should clearly describe the approach to measure and verify each of these targets and should demonstrate that the pilot system would offer a clear approach towards overall reduced power consumption.
- Description of software issues, including software stack, software scaling and adaptation for heterogeneous systems, software reliability, optimisation, and inclusion of a set of software programming tools and environments, compiler technologies for basic instruction sets and for higher level support of applications at scale with various programming models, etc. Pilot systems should aim to offer a pluralism in European solutions and maximise their integration inside the software stack.
- The integration of different European cooling systems, including prototype systems for their further testing and development.
- Clear identification of the European technology hardware and building blocks and how they are integrated and leveraged in the pilot systems. In particular, proposals have to demonstrate how the pilot system aligns with the efforts of European low power processing technologies, by describing the mechanisms that will be used for that purpose.
- Identification of a set of ambitious and relevant applications for the system co-design, describing how and when application developers and users will be involved in the co-design process, and what measures will be taken to attract and motivate users and developers to adopt the technologies proposed in the pilot system, in view of maximising their use and acceptance.
- Clear timed description of the engineering approach for the pilot systems, indicating for example the timing to development and release of the proposed hardware and software solutions, evaluation, testing, and the validation and deployment of the pilot systems in close-to-operation environments. The approach should also describe the involvement of users and developers (with the eventual re-writing, porting, re-factoring etc. of codes) in a co-design approach.
- Description of the use of the pilot systems in the operational environment during the life of the project and once the project is completed, including targeted services, communities and applications, etc...
- Description of mechanisms for cooperation between the pilot systems that would be supported by the action: the successful proposals are expected to establish a close collaboration in order to ensure to the extent possible the convergence and compatibility of the different results and solutions developed in the pilot systems, e.g. hardware/software stacks, components, common or fully interoperable software

environments, common or fully interoperable application development platforms, common architectural views, etc. These mechanisms will be formalised in a cooperation framework gathering the selected pilot systems.

Wherever appropriate, actions should seek synergies and co-financing from relevant national or regional research and innovation programmes.

The EuroHPC JU considers that proposals requesting a contribution from the JU of up to EUR 22 million for the first pilot above and up to 15 million for the second pilot above, matched by the Participating States with a similar amount, and a duration of between 3 and 4 years would allow this specific challenge to be addressed appropriately. Nevertheless this does not preclude submission and selection of proposals with another duration or requesting other amounts.

Considering the specific objectives of the calls for proposals and the fact that these calls concern areas of critical importance for the security of the Union and the Digital Single Market and may pose potential risk to ensuring European technological autonomy in line with Article 9(5) of the Rules for Participation², the EuroHPC JU may limit the participation of legal entities established in associated countries and legal entities established in the EU but controlled from third countries.

Expected Impact: Proposals should describe how the proposed work will contribute to the impacts listed below and include a baseline, targets and metrics to measure impact:

1. Contribution to the realisation of the EuroHPC JU's overall and specific objectives³
2. Strengthening scientific leadership as well as the competitiveness and innovation potential of the European industry through the further development and use of European technologies
3. Contributing to a sustainable exascale HPC supply ecosystem in Europe and ensuring European technological autonomy in this field
4. Leveraging the efforts on the European low power processing (in particular the European Processor Initiative) or in open hardware technologies and contributing to the realisation of future exascale system architectures based on such technologies
5. Maximising the use of European technologies in users and developers of relevant applications for European scientific and industrial leadership
6. Creation, promotion and exploitation potential of European IP
7. Maturity of solutions and potential for exploitation in future European exascale HPC components and systems

Type of Action: Research and Innovation Action

EuroHPC-2020-01-b: Pilot on quantum simulator

State-of-the-art scientific computing, especially for large-scale applications, lies in the massively parallel heterogeneous architectures of HPC systems. Accelerators can maximize the parallelism of HPC systems for scientific computing. However, solving large scientific problems requires huge amounts of computing capacities and memory that current HPC systems cannot optimally address. One solution for performing computations with such a large amount of memory and processors would be the quantum simulator.

²https://ec.europa.eu/research/participants/data/ref/h2020/legal_basis/rules_participation/h2020-rules_participation_en.pdf

³ Council Regulation 2018/1488 of 28 September 2018 establishing the European High Performance Computing Joint Undertaking (EuroHPC) <https://eurohpc-ju.europa.eu/documents/Regulation.pdf>

A quantum simulator is a highly controllable quantum device that allows one to obtain insights into properties of complex quantum systems or solve specific computational problems inaccessible to classical computers. It can efficiently complement the parallel architecture of current supercomputers and act as “accelerator”, addressing applications related to complex simulation and optimisation problems, notably for materials development, drug discovery, transportation and other real-world problems of high importance to industry.

The objective of the pilot action will be to develop, deploy and coordinate at European level a European quantum simulation (QS) infrastructure of circa 100+ interacting quantum units that shall be accessible via the cloud on a non-commercial basis to public and private European users. European quantum simulation technologies are currently being developed by EU projects or by national projects in the Member States. The action will cover the acquisition of one such quantum simulator and its maintenance costs, the development of the interconnection between the classical supercomputer and the quantum simulator and the development of the necessary cloud access and middleware for programming and running applications in the quantum simulator. The European quantum simulator should be hosted by a supercomputing center located in the Union and co-located with a EuroHPC or Tier-0 supercomputer that should be existing at the moment when the project would start or soon after.

The objective of opening up such early computing platforms (whether in the form of quantum simulators or first physical computing platforms) widely to European users is to help them familiarize with quantum technologies, test their capabilities/performances and develop their first quantum applications and algorithms. The aim is not only to train users in using quantum computing systems but, most importantly, to develop an early ecosystem of quantum programming facilities and application libraries.

The EuroHPC JU considers that proposals requesting a contribution from the JU of up to EUR 6 million, matched by the Participating States with a similar amount, and a duration of between 3 to 5 years would allow this specific challenge to be addressed appropriately. The costs include the acquisition of one quantum simulator and its maintenance and operation cost.

Expected Impact:

- Contribution to the realisation of the EuroHPC JU’s overall and specific objectives⁴;
- Contribution to the development of a first ecosystem of hybrid HPC and quantum programming facilities and applications;
- Contribution to the next generation of modular HPC systems;
- Providing Europe’s scientists and engineers with first experimental facilities to familiarise themselves with quantum technologies and develop the use cases;

Type of Action: Research and Innovation Action

⁴ Council Regulation 2018/1488 of 28 September 2018 establishing the European High Performance Computing Joint Undertaking (EuroHPC) <https://eurohpc-ju.europa.eu/documents/Regulation.pdf>

Call management rules

Conditions for the Call - H2020-JTI-EuroHPC-2020-1

Opening date(s), deadline(s), indicative budget(s):

Topics (Type of Action)	Budgets (EUR million)	Deadlines
	2020	
Opening: 16 April 2020		
EuroHPC-2020-01-a (RIA)	37.00	15 September 2020
EuroHPC-2020-01-b (RIA)	6.00	28 July 2020
Overall indicative budget	43.00	

Indicative timetable for evaluation and grant agreement signature:

For single stage procedure:

- Information on the outcome of the evaluation: Maximum 5 months from the final date for submission; and
- Indicative date for the signing of grant agreements: Maximum 8 months from the final date for submission.

Eligibility and admissibility conditions: The conditions are described in General Annexes A, B and C of the Horizon 2020 Work Programme 2018-2020⁵.

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in General Annex H of the Horizon 2020 Work Programme 2018-2020.

Evaluation Procedure: The procedure for setting a priority order for proposals with the same score is given in General Annex H of the Horizon 2020 Work Programme 2018-2020.

The full evaluation procedure is described in the relevant [guide](#) published on the Funding & Tenders Portal.

Grant Conditions:

EuroHPC-2020-01-a and EuroHPC-2020-01-b	As an exception from General Annex D of the Horizon 2020 Work Programme 2018-2020, the funding rate for eligible costs in grants awarded by the JU for this topic will be 50% of the eligible costs.
EuroHPC-2020-01-a and EuroHPC-2020-	Grants awarded under this topic will be complementary.

⁵ http://ec.europa.eu/research/participants/data/ref/h2020/other/wp/2018-2020/annexes/h2020-wp1820-annex-ga_en.pdf

01-b	The respective options of Article 2, Article 31.6 and Article 41.4 of the EuroHPC JU Model Grant Agreement will be applied.
EuroHPC-2020-01-a and EuroHPC-2020-01-b	<p>Participants are encouraged to include a security self-assessment identifying any security issues and detailing how those issues will be addressed in order to comply with the relevant national and Union laws. Where appropriate, the Joint Undertaking may carry out a security scrutiny for proposals raising security issues in accordance with General Annex J of the Horizon 2020 Work Programme 2018-2020. The security scrutiny may lead to security requirements that are set out in Annex 1 to the EuroHPC JU Model Grant Agreement.</p> <p>For grants awarded under this topic the JU may object to a transfer of ownership or the exclusive licensing of results to a third party established in a third country not associated to Horizon 2020. The respective option of Article 30.3 of the EuroHPC JU Model Grant Agreement will be applied.</p> <p>Additionally, the Work Plan foresees additional exploitation obligations, requiring that first exploitation of the results takes place in Europe using an option of Article 28 of the EuroHPC JU Model Grant Agreement as a default option.</p>

Consortium agreement:

EuroHPC-2020-01-a and EuroHPC-2020-01-b	Members of consortium are required to conclude a consortium agreement, in principle prior to the signature of the grant agreement.
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