EuroHPC JOINT UNDERTAKING

DECISION OF THE GOVERNING BOARD OF THE EuroHPC JOINT UNDERTAKING No 20/2024

Amending the Joint Undertaking's Work Programme and Budget for the year 2024 (Amendment no 2)

THE GOVERNING BOARD OF THE EUROHPC JOINT UNDERTAKING,

Having regard to Council Regulation (EU) 2021/1173 of 13 July 2021 on establishing the European High Performance Computing Joint Undertaking and repealing Regulation (EU) 2018/1488[1], (hereinafter, "the Regulation"),

Having regard to the Statutes of the European High Performance Computing Joint Undertaking annexed to the Regulation (thereinafter "Statutes") and in particular to Articles 1(o), 7(3)(d), 7(5)(b), 9(4)(b) and (c) and 18 of thereof,

Having regard to Decision of the Governing Board of the EuroHPC Joint Undertaking No 3/2020, approving the Financial Rules of the EuroHPC Joint Undertaking[2],

Having regard to Decision of the Governing Board of the EuroHPC Joint Undertaking No 44/2023 adopting the Joint Undertaking's Work Programme and Budget for the year 2024,

Having regard to Decision of the Governing Board of the EuroHPC Joint Undertaking No 11/2024 of 21 March 2024 amending the Joint Undertaking's Work Programme and Budget for the year 2024 (Amendment no 1),

WHEREAS

(1) A Decision of the Governing Board No 11/2024 of 21 March 2024 adopting the Joint Undertaking's Work Programme and Budget for the year 2024 needs to be amended for the reasons specified below.
(2) The Statutes of the EuroHPC JU confer on the Governing Board the powers to adopt the annual work programme and its annual budget including the staff establishment plan.

[1] OJ L 256, 19.7.2021, p. 3–51.

[2] Readopted by Decision of the Governing Board of the EuroHPC Joint Undertaking No 17/2021, approving the re-adoption of Governing Board Decisions adopted under the framework of Regulation (EU) 2018/1488 and its updated Rules of Procedure in the view of Regulation (EU) 2021/1173.

(3) The following amendment concerns the operational activities of the Joint Undertaking and does not provide any changes to the budget.
(4) The annual Work Programme needs to be amended for the second time in 2024 to reflect the following changes:
    a. An action for a Specific Grant Agreement on RISC-V
(5) The Executive Director of the EuroHPC Joint Undertaking submitted the amended Work Programme to the Governing Board.
(6) In the interest of legal certainty and clarity, an amended Work Programme and Budget of the EuroHPC Joint Undertaking for the year 2024 shall be adopted by the Governing Board.
(7) During the 38th Governing Board meeting, the Governing Board discussed the scope of this amendment and agreed to launch the process of adoption in written procedure. Therefore, the Governing Board

HAS ADOPTED THIS DECISION:

Article 1

The amended Annual Work Programme and Budget of the EuroHPC Joint Undertaking for the year 2024 annexed to this decision is adopted.

Article 2

The Executive Director shall make the amended Annual Work Programme and Budget 2024 publicly available on the website of the EuroHPC Joint Undertaking.

Article 3

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

Done at Luxembourg, on 13 May 2024.

For the Governing Board

Rafal Duczmal

The Chair

Annex: European High Performance Computing Joint Undertaking Annual Work Programme and Budget 2024 (Amendment no 2)

WORK PROGRAMME and BUDGET

EuroHPC JOINT UNDERTAKING (JU)

2024

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ANNUAL WORK PROGRAMME YEAR 2024

INTRODUCTION

The EuroHPC Joint Undertaking (hereinafter "EuroHPC JU" or "JU"), will contribute to the ambition of value creation in the Union with the overall mission to develop, deploy, extend and maintain in the Union an integrated world class supercomputing and quantum computing infrastructure and to develop and support a highly competitive and innovative High Performance Computing (HPC) ecosystem, extreme scale, energy-efficient, environmentally sustainable and highly resilient HPC and data technologies.

In July 2021, Council Regulation (EU) 2021/1173 (EuroHPC JU Regulation) was adopted, repealing Council Regulation (EU) 2018/1488, and provides the basis of the Work Programmes of the Joint Undertaking.

The Annual Work Programme 2024 contains the actions to be implemented in 2024. Calls to be launched in 2024 will be prepared by the JU and presented for adoption by the Governing Board by separate Governing Board Decisions.

For all activities implemented by the EuroHPC JU that are funded from the Horizon Europe (HE) budget, the Governing Board may decide to limit in the calls for proposals the eligibility of participants according to Horizon Europe Article 22(5).

For all activities implemented by the EuroHPC JU that are funded from the Digital Europe Programme (DEP) budget, the Governing Board may decide to limit in the calls for proposals or procurements the eligibility of participants according to Digital Europe Articles 12(6) and 18(4).

For all activities implemented by the EuroHPC JU that are funded from the Connecting Europe Facility (CEF) budget, the Governing Board may decide to limit in the calls for proposals or procurements the eligibility of participants according to Connecting Europe Facility Article 11(4).

All actions with Union contribution below 100% are EU Synergy calls. Grants and procurements can be linked with another grant funded from any other EU funding programme including the Recovery and Resilience Fund, provided that there is no double funding and that such support does not cover the same cost. The grants under both calls will be managed as linked actions.

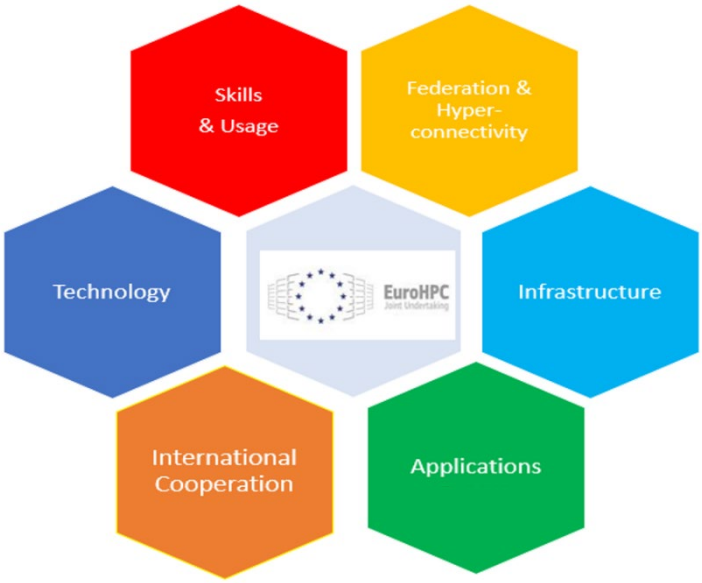
OPERATIONS

The key objective of the EuroHPC JU is to further deploy and provide access in the Union to a world leading service and data infrastructure with high-end supercomputers which are indispensable to run the most demanding and strategic applications, such as climate change, personalised medicine etc.

This action builds on the previous infrastructure activities undertaken by the EuroHPC JU since its creation in 2018. The Operational section of this Work Programme will be organised using the Pillars of activity as set out in Regulation

Pillars of Action (Regulation 2021/1173)

The Annual Work Programme will follow the different pillars of actions as set out in the Founding Regulation (2021/1173).



Since most actions are ongoing over more than one year, this work programme will summarise ongoing actions in each Pillar (if any) and then in a separate section introduce the Calls to be launch in 2024.

Table of 2024 Actions with budget allocation (estimated amounts in EUR)

Pillar	**Actions**	**Funding source**	**Type of action/ Funding rate**	**Planned EU Contribution**	**Total planned Budget**
Infrastructure	1st CFEI post-exascale Supercomputer	DEP	EU 50% (Capex +Opex) PS 50%	400 Million (to be committed in 2025)	800 Million (to be committed in 2025)
	2nd CEI for an Industrial HPC for AI or other applications of industrial relevance	DEP	EU 35% (Capex only)	45.6 Million	130.4 Million

	Upgrading EuroHPC systems to AI (commitment planned in 2025)	DEP	EU 35% PS 65%	60 Million	171 Million
	3rd CFEI Quantum Computing	DEP	EU 50% PS 50%	10 Million	20 Million
	Procurement for Peer Review Platform	DEP	EU 100%	1.8 Million	1.8 Million
Connected and Federated	Connected HPC infrastructure and services	CEF-2	EU 100 %	60 Million	60 Million
Technology	Enhancing competitive European microprocessor technology for HPC	Horizon Europe	EU 50% PS 50%	48.6 Million	97.3 Million
	Enabling Universal Access and Integration of Quantum Resources	Horizon Europe	EU 50% PS 50%	10 Million	20 Million
	Development of new benchmarks for HPC, Quantum Computing, and AI	Horizon Europe	EU 50% PS 50%	10 Million	20 Million
	HPC/QC Middleware technologies	Horizon Europe	EU 50% PS 50%	20 Million	40 Million
	Specific Grant Agreement on RISC-V	Horizon Europe	EU 50% PS 50%	120 Million (committed in 2023)	120 Million

Applications	Quantum application prizes	Horizon Europe	EU 100%	300,000 EUR	300,000 EUR
	HPC for AI Software Ecosystem	Horizon Europe	EU 50% PS 50%	8 Million	16 Million
	HPC Applications	Horizon Europe	EU 50% PS 50%	10 Million	20 Million
	Centres of Excellence to support the development of exascale applications	Horizon Europe	EU 50% PS 50%	10 Million	20 Million
	HPC/Cybersecurity/AI	DEP	EU 50% PS 50%	5 Million	10 Million
	Continuous integration and deployment platform (CI/CD)	DEP	EU 100%	5 Million	5 Million
Competences and Skills	EuroHPC Masters Programme (2nd call)	DEP	100%	10 Million	10 Million
	2nd National Competence Centre Call	DEP	EU 50% PS 50%	5 Million	10 Million
	EuroHPC Summit 2025	DEP	100%	700,000 EUR	700,000 EUR
	User Day 2024	DEP	100%	150,000 EUR	150,000 EUR
International	Support EU Digital Partnership activities	Horizon Europe	100%	10 Million	10 Million

To cover all JU activities in 2024, the JU will count on the annual EU contribution of EUR 201 Million, which includes EUR 74 Million from DEP and EUR 127 Million from Horizon Europe, and re-activated credits from past years for an additional amount of EUR 81 Million.

INFRASTRUCTURE PILLAR

Ongoing activities:

The JU's Infrastructure strategy will continue to be implemented in 2024.

- The first exascale supercomputer to be located in Jülich Supercomputing Centre in Germany will be operational in 2024 in time for the TOP 500 ranking to be announced in late 2024.
- The JU will continue to provide technical guidance and administrative support to the four designated hosting entities (Greece, Ireland, Hungary and Poland) to procure a midrange supercomputer each.
- The JU will provide technical guidance and administrative support on the procurements of the two upgraded systems (Lisa/Leonardo and Discoverer +)
- In 2024, the JU will finalise the procurements of the six quantum computers.
- The JU will launch a procurement for a second exascale supercomputer, to be located in France, based on the selection of a Hosting Entity, presented by the Jule Verne Consortium and subsequently agreed by the Governing Board in 2023.
- In 2024, the JU will evaluate proposals to select hosting entities for the third set of mid-range supercomputers based on calls for expression of interest launched in 2023.
- The JU will evaluate proposals to select hosting entities for the second call for expression of interest of quantum computers launched in 2023 and will procure them in 2024.
- In order to develop a fully operational access capacity for users of EuroHPC Systems, the JU will update its access procedures in line with the amended access policy adopted in 2023.

Calls 2024

Call for expression of interest for the acquisition and operation of a post-exascale supercomputer.

The EuroHPC JU will launch a Call for Expression of Interest for a post-exascale supercomputer. With the support of independent external experts, the hosting entities will be selected by the Governing Board of the Joint Undertaking following the call for expression of interest.

This supercomputer will be hosted in national Supercomputing Centres (as a hosting entity or as a support to the hosting entity, depending on the national organization) already established in Member States that is a Participating State of the Joint Undertaking. The procurement of this supercomputer is foreseen for late 2026. The budget for this acquisition will be available to the JU and appear in Work Programme 2025[3]. This supercomputer should strive to incorporate to the maximum extent available European technology and applications for all

core elements (CPUs and accelerators), be a system of at least 1 Exaflop computing performance, represent a significant step forward compared to EuroHPC Exascale systems, and be able to accommodate post exascale[4], AI and other date intensive applications. Furthermore, the system could strive to include novel architectures which go beyond floating point operations.

The eligibility conditions are those established in the EuroHPC JU Regulation. The Governing Board may decide in the Work Programme, if duly justified for security reasons, to condition the participation of suppliers in the acquisition of the high-end supercomputers in accordance with Article 12(6) of Regulation (EU) 2021/694 or to limit the participation of suppliers for security reasons or actions directly related to the Union's strategic autonomy, in accordance with Article 18(4) of that Regulation. Applications to the call for expression of interest should therefore provide a first indication if the hosting entity would consider conditioning or limiting the participation of suppliers for security reasons and/or reasons related to the Union's strategic autonomy.

Budget: The total indicative budget of EUR 800 Million for the acquisition and operation of a post-exascale supercomputer would be made up an EU contribution (DEP) of EUR 400 Million committed in 2025 matched by a PS contribution of EUR 400 Million.

SPECIFIC CONDITIONS FOR THE CALL FOR EXPRESSION OF INTEREST FOR THE ACQUISITION AND OPERATION OF A POST-EXASCALE HIGH END SUPERCOMPUTER (CFEI 2024; SELECTION OF HOSTING ENTITY 2025; PROCUREMENT 2026)	
Expected EuroHPC JU contribution per project	The EuroHPC JU estimates that an EU contribution of up to EUR 400 Million matched by a PS contribution of up to EUR 400 Million committed in 2025 would allow for the acquisition and operation of one post-exascale supercomputer.
Indicative budget	The total indicative budget for the EU contributions to the topic is up to EUR 400 Million and will be committed in 2025
Type of Action	Call for expression of interest
Eligibility conditions	The eligibility conditions are those established in Article 11 of the EuroHPC JU Council Regulation (EU) 2021/1173. Article 12.6 of the Digital Europe Programme will apply, whereby in order to achieve the expected outcomes, and safeguard the Union’s strategic assets, interests, autonomy, or security, participation is limited to legal entities established in Member States and in the following Associated Countries to Horizon Europe: Iceland, Norway. Proposals including entities established in countries outside this scope

	specified in the topic/call/action will be ineligible.

Second Call for Expression of Interest for the selection of a Hosting Entity to acquire and operate an industrial grade EuroHPC Supercomputer for Artificial Intelligence (AI) or other applications of industrial relevance.

Scope: With the growing dependence on supercomputers to process ever increasing amounts of data, the JU will launch a Call for Expression of Interest to procure HPC systems to be co-owned and used by the industrial sector based in the European Union.

Article 13 of Regulation (EU) 1173/2021 states that the system should be at least a mid-range level system and should be hosted in existing EuroHPC Hosting Entity. EuroHPC JU will fund 35% of acquisition costs.

The Joint Undertaking should acquire, together with a consortium of private partners, at least mid-range level supercomputers, or partitions of EuroHPC supercomputers, primarily destined for use by industry for AI driven-applications and should co-own them with a consortium of private partners.

The Union financial contribution should cover up to 35% of the acquisition costs of the EuroHPC supercomputers, or the partitions of the EuroHPC supercomputers. The remaining total cost of ownership of the EuroHPC supercomputers, or the partitions of the EuroHPC supercomputers, shall be covered by the consortium of private partners.

The selection of the supplier of an industrial-grade EuroHPC supercomputer should be based on tender specifications that should take into account the user requirements and the general system specifications provided by the selected hosting entity in its application for the call for expression of interest. The selection should also address the security of the supply chain. In addition, the system requirements will take into account needs of the industrial AI community and applications.

The Governing Board may decide in the work programme, if duly justified for security reasons, to condition the participation of suppliers in the acquisition of the industrial grade EuroHPC supercomputers in accordance with Article 12(6) of Regulation (EU) 2021/694 or to limit the participation of suppliers for security reasons or actions directly related to the Union's strategic autonomy, in accordance with Article 18(4) of that Regulation.

The EuroHPC supercomputers or the EuroHPC supercomputer partitions for industrial use should be hosted in a hosting entity of a EuroHPC supercomputer.

The Call for Expression of Interest will be launched in 2024 and the expected procurement will take place in 2025.

Indicative Budget: An indicative budget from DEP of EUR 45.6 Million matched by a contribution of EUR 84.8 Million from the consortium of private partners would allow for the acquisition and operation of one industrial grade EuroHPC Supercomputer.

SPECIFIC CONDITIONS: CALL FOR EXPRESSION OF INTEREST FOR THE ACQUISITION OF AN INDUSTRIAL EUROHPC SUPERCOMPUTER for AI OR OTHER APPLICATIONS OF INDUSTRIAL RELEVANCE (CFEI 2024; PROCUREMENT 2025)	
Expected EuroHPC JU contribution per project	The EuroHPC JU estimates that an EU contribution of up to EUR 45.6 Million towards an industrial HPC would allow for the acquisition of one EuroHPC JU industrial supercomputers. The Consortium of private partners would contribute 65% of the procurement which is the equivalent of EUR 84.8 Million
Indicative budget	The total indicative budget for one EuroHPC JU industrial supercomputers is up to EUR 130.4 Million.[3]
Type of Action Eligibility conditions	Call for expression of interest The eligibility conditions are those established in the EuroHPC JU Council Regulation (EU) 2021/1173, and in particular Article 13 of this Regulation. Article 12.6 of the Digital Europe Programme will apply, whereby in order to achieve the expected outcomes, and safeguard the Union's strategic assets, interests, autonomy, or security, participation is limited to legal entities established in Member States and in the following Associated Countries to Horizon Europe: Iceland, Norway. Proposals including entities established in countries outside this scope specified in the topic/call/action will be ineligible.

Call for expression of interest for the upgrade of EuroHPC JU supercomputers with Artificial Intelligence capacities to address the evolution of user needs

On 13 September 2023, the President of the Commission stated in her State of the Union address "*that the Union would deliver on the AI Act by guiding AI innovation in a responsible way and 'open-up' our high performance computers to AI start-ups to train their models"*. To support this EU strategic initiative, a call for expression of interest to upgrade current EuroHPC systems to provide enhanced and/or additional AI functionalities will be launched which will allow for eligible EuroHPC supercomputers to be accessible to train large responsible AI models. The call for expression of interest should define the specific eligibility conditions that should apply to a hosting entity which is already hosting a EuroHPC supercomputer'. Furthermore, article 15 of the EuroHPC JU Regulation states that 'The maximum EU contribution to such upgrades may not exceed EUR 150 Million for the period 2021-2027'. In consequence, EuroHPC JU will launch Call for Expression of Interest for the selection of EuroHPC supercomputers to be upgraded that are owned or co-owned by EuroHPC JU, on the basis and in accordance with the Council Regulation (EU) 2021/1173, and taking into account the EU Financial Regulation.

The Union financial contribution for the upgrade shall cover up to 35 % of the acquisition costs of the upgrade, depreciated over the expected remaining lifetime of the original supercomputer and up to 35 % of the additional operating costs. The total cost of the upgrade shall not exceed 30 % of the total acquisition cost of the original EuroHPC supercomputer.

The share of the Union's access time to the upgraded EuroHPC supercomputer shall remain unchanged over the lifetime of the machine. If the upgrade entails an increase of capacity, the additional access time should be directly proportional to the Union contribution.

The Governing Board may decide in the Work Programme, if duly justified for security reasons, to condition the participation of suppliers in the upgrade of these supercomputers in accordance with Article 12(6) of Regulation (EU) 2021/694 or to limit the participation of suppliers for security reasons or actions directly related to the Union's strategic autonomy, in accordance with Article 18(4) of that Regulation.

Budget: An indicative budget will be allocated from the Digital Europe Programme of EUR 60 Million (procurement of the upgrades will take place in 2025) for the upgrading of several EuroHPC supercomputers.

An indicative EU contribution of EUR 60 Million (35% of acquisition and operating costs) will be matched by a PS contribution of EUR 111 (Million 65% acquisition and operating costs) would allow for the upgrading of a number of EuroHPC supercomputers.

SPECIFIC CONDITIONS FOR THE CALL FOR EXPRESSION OF INTEREST FOR THE UPGRADING OF EUROHPC SUPERCOMPUTERS WITH ARTIFICIAL INTELLIGENCE TO ADDRESS THE EVOLUTION OF USER NEEDS (CFEI 2024; SELECTION OF HOSTING ENTITY 2025; PROCUREMENT 2026)	
Expected EuroHPC JU contribution per project	The EuroHPC JU estimates that an EU contribution of EUR 60 Million would allow for the upgrading of eligible EuroHPC supercomputers

Indicative budget	The total indicative budget for the EU contributions to the topic is up to EUR 60 Million (35% of acquisition and operating costs) will be matched by a PS contribution of EUR 111 (Million 65% acquisition and operating costs) would allow for the upgrading of a number of EuroHPC supercomputers.
Type of Action	Call for expression of interest
Eligibility conditions	The eligibility conditions are those established in Article 15 of the EuroHPC JU Council Regulation (EU) 2021/1173. A hosting entity shall be eligible to respond to this call for expressions of interest at the earliest one year after the selection date of the hosting entity of the EuroHPC supercomputer. A EuroHPC supercomputer may be upgraded only once.

Procurement for Peer Review Platform

Objective:
To date, EuroHPC JU has procured eight supercomputers hosted and operated by respective Hosting Entities:

- MeluXina, hosted by LuxProvide in Bissen, Luxembourg
- Vega, hosted by IZUM in Maribor, Slovenia
- Karolina, hosted by IT4Innovations in Ostrava, Czech Republic
- Discoverer, hosted by the consortium Petascale Supercomputer Bulgaria in Sofia, Bulgaria
- Deucalion, hosted by MACC in Minho, Portugal
- LUMI, hosted by CSC in Kajaani, Finland
- Leonardo, hosted by CINECA in Bologna, Italy and
- MareNostrum 5 (MN5), hosted by BSC in Barcelona, Spain

EuroHPC JU implements an international peer-review process for the distribution of the Union's share on the access time to the above-mentioned supercomputers (hereinafter, "Peer-Review Process"). This is a process that ensures open, fair, and unbiased access to EuroHPC Supercomputers. This Peer-Review Process is also applicable to future EuroHPC supercomputers that will become operational in the coming years.

EuroHPC JU has relied until now on the peer-review platform that has been developed and maintained by the Partnership for Advanced Computing in Europe (hereinafter, 'PRACE'). Currently this platform hosts all data regarding EuroHPC's Access calls during the past two years. As this platform has been developed to support the specific peer-review process

implemented by PRACE, EuroHPC wishes to procure and evolve its own private platform, tailor-made for the requirements, the specific processes, and peer-review workflows implemented for the Joint Undertaking.

In particular, within this procurement will:

- Procure the license of an existing, operational peer-review platform software.
- Deploy an instance of the platform to be operationally supported by the contractor for the period of the procurement contract.
- Migrate data from the existing PRACE portal to the new instance, ensuring service continuation and undisrupted execution of the peer-review processes.
- Evolve the platform code to match its functionality with the requirements of the EuroHPC processes especially in regards to new requirements stemming from HPC applications domains like Generative AI, Machine Learning etc.
- Procure the necessary services for hosting and operational support of the service.
- Ensure support and maintenance services based on specific SLAs that will ensure quick resolution of operational issues, bug fixes and implementation of new features, following the evolution of the EuroHPC peer-review processes as defined in the current and future versions of the Access Policy.

Nature of the Procedure:

The subject of this call for tenders is "Development, Hosting and Support of the EuroHPC JU Access Calls peer-review platform".

- Legal basis:

This call for tenders is governed by the provisions of the EU Financial Regulation.

EuroHPC JU will award the contract resulting from this call for tenders through an open procedure pursuant to Article 164(1) (a) of the EU Financial Regulation. Period of execution of the tasks:

The contract will last a period of 36 months with the possibility of being renewed twice for an additional period of 12 months per renewable. The maximum contract duration including the renewables shall be no longer than 60 months.

- Price and Terms of Payment

The maximum price payable under this contract is set at EUR 1.8 Million.

The first contract with a duration of three years will have a maximum price of EUR 1.2 Million to be paid as follows:

- EUR 600,000 for the first year of the contract. Payment covers software licence, system deployment, data migration, operational costs, support and evolution of the software for this year.
- EUR 300,000 for the second year of the contract, covering operational costs, support and evolution of the software for this year.
- EUR 300,000 for the third year of the contract, covering operational costs, support and evolution of the software for this year.
- In case EuroHPC wishes to renew the contract the price is payable as follows:
- EUR 300,000 for each year of contract renewal, up to two years, covering operational costs, support and evolution of the software

SPECIFIC CONDITIONS FOR THE PROCUREMENT OF THE "DEVELOPMENT, HOSTING AND SUPPORT OF THE EUROHPC JU ACCESS CALLS PEER-REVIEW PLATFORM" (PROCUREMENT 2024)	
Expected EuroHPC JU contribution per project	The EuroHPC JU estimates that an EU contribution of EUR 1.8 Million would allow for this procurement
Indicative budget	The total indicative budget for the EU contributions to the topic is up to EUR 1.8 Million from the Digital Europe Programme
Type of Action	Procurement
Eligibility conditions	The eligibility conditions are those established in EU Financial Regulation and Regulation 2021/1173

3rd Deployment of European quantum computers

This is a follow-up to the EuroHPC Work Programme 2022 and 2023 actions on the procurement and operation of the quantum computers for integration into HPC supercomputers.

The overarching goal is to establish in Europe a world-leading hyper-connected quantum computing service and data infrastructure ecosystem, and to enable the research community and European industry produce world-class outputs and to accelerate the broad exploitation and uptake of European research and technology across the Union.

The primary objective of this action is to make European quantum computers integrated with EuroHPC Participating States supercomputers, in a hybrid configuration, available to users in order to address a growing demand from European industry and academia for applications with industrial, scientific and societal relevance for Europe. The activities should leverage European technology, in particular quantum computing technologies developed within the Quantum Flagship, other European initiatives and national Quantum research programmes of the EuroHPC Participating States. The action should foster the emergence of real use case applications, and mature large-scale quantum computing in Europe. This will contribute to the development of an ecosystem of quantum programming facilities, application libraries and skilled workforce.

The action will cover the acquisition of the quantum computers, their integration with the HPC supercomputing infrastructure, and their operations. The aim is to support multiple proposals with diverse technologies to give European HPC users access to as many different quantum technologies as possible. The focus should be on technology approaches that are not addressed by the successful hosting entities of the EuroHPC 2022 and 2023 Calls for Expression of interest.

The action should look for synergies and cooperation with the relevant projects at European or national level developing or testing the different layers of the software stack, quantum

applications, or use cases, notably the projects resulting from previous EuroHPC Quantum Computer procurements and calls (EUROHPC-2022-CEI-QC-01, EUROHPC-2023-CEI-QC-01 and H2020-JTI-EUROHPC-2020-01) and the Quantum Flagship call HORIZON-CL4-2021-DIGITAL-EMERGING-02-10 Strengthening the quantum software ecosystem for quantum computing platforms, HORIZON-CL4-2021-DIGITAL-EMERGING-02-15: Framework Partnership Agreement for developing the first large-scale quantum computers (FPA)

Grants will be established, on the basis of Article 195 (f) of the Financial Regulation (EU, Euratom) 2018/1046, to cover costs for the integration of the quantum computer with the hosting entity's supercomputer based on solutions already developed in previous and ongoing calls. The reimbursement from the EuroHPC JU will be calculated on the basis of the declared costs up to the maximum total contribution of the EuroHPC JU or up to a ceiling of 50 % of the declared eligible costs, whichever is lower.

EUROHPC-2024-CEI-QC-01: Call for expression of interest for the hosting and operation of European quantum computers integrated in EuroHPC supercomputers

The EuroHPC Joint Undertaking (JU) will launch a call for expression of interest to identify hosting entities for the procurement and operation of quantum computers, their integration with HPC supercomputers and the development of a quantum software stack. Applicants could be either single European entities or consortia of European entities. The EuroHPC JU will initiate and manage the Calls for Expression of Interest for hosting quantum computers and evaluate the applications received, with the support of independent external experts. The hosting entities will be selected by the Governing Board of the Joint Undertaking following the call for expression of interest.

Following the selection of the hosting entities the EuroHPC JU will initiate the procurement of the quantum computers. The specific conditions of the procurement will be defined in a call for tender. For security related reasons and as the action is directly related to the Union's strategic autonomy, the participation of suppliers in the acquisition of the quantum computers will be subject to conditions in accordance with Article 12(6) of Regulation (EU) 2021/694, and in accordance with Article 18(4) of that Regulation.

The selected hosting entities will sign a hosting agreement with the EuroHPC JU, in accordance with Article 10 of the EuroHPC Regulation, and sign with the EuroHPC JU a grant to cover the Union's share of the operational costs. Pursuant to Article 10 of the Regulation 2021/1173, the EuroHPC JU will be the owner of the quantum computers.

The quantum computers should be hosted in national Supercomputer Centres already established in Member States that are Participating States of the Joint Undertaking. The selection will aim at ensuring a diversity in the technologies and architectures of the different quantum computers to be acquired. Preference shall be given to technology approaches not already part of or foreseen for the EuroHPC QC infrastructure.

The applications submitted to the call for expression of interest should enable the development of real use cases supporting the adoption of applications with scientific, industrial and societal relevance for Europe. Although identified applications do not need to provide a definite quantum advantage, they must allow the development of libraries for quantum

computers/simulators in a HPC environment based on solutions already developed in previous and ongoing calls.

Furthermore, the applications submitted to the call for expression of interest should support the implementation and testing of quantum software stacks, libraries etc. that facilitate the link from a high-level description of algorithms to a low-level implementation on the hardware, for solving concrete problems and applications expected to demonstrate quantum advantage.

The Quantum/HPC integration should, whenever possible, rely on existing solutions developed, for example, by other EuroHPC initiatives or national projects.

The Union financial contribution to the EuroHPC JU shall cover up to 50 % of the acquisition costs, up to 50 % of the operating costs of the quantum computer, and up to 50% of the integration costs. The remaining total cost of ownership of the quantum computer (including VAT if applicable) shall be covered by the Participating State where the hosting entity is established or by the Participating States in the hosting consortium.

Grants will be established to cover the operating costs of the quantum computer. The reimbursement from the EuroHPC JU will be calculated on the basis of the declared costs up to the maximum total contribution of the EuroHPC JU or up to a ceiling of 50 % of the declared eligible costs, whichever is lower.

Grants will be established to cover costs for the integration of the quantum computer with the hosting entity's supercomputer based on solutions already developed in previous and ongoing EuroHPC or national initiatives. The reimbursement from the EuroHPC JU will be calculated on the basis of the declared costs up to the maximum total contribution of the EuroHPC JU or up to a ceiling of 50 % of the declared eligible costs, whichever is lower.

The costs related to the adaptation of the hosting site per se (e.g. costs related to the building infrastructure that will host the quantum computer) shall not be covered by the EuroHPC JU. However, the costs of the preparation of the hosting site incurred by the hosting entity that can be directly accounted to the installation of the quantum computer may be considered as part of the Total Cost of Ownership (TCO) and may thus be considered as eligible costs that can be covered by the EuroHPC JU.

The quantum computers can range from pilots and experimental systems to prototypes and operational systems. There is no restriction on the type of quantum computer to be included in the proposal. However, proposals should clearly identify the technical features of the targeted quantum computer including the quantum processing unit (qubits, entanglement capability, control etc.) and the integration (type interface, interconnection, software stack etc.) between the quantum computer/simulator and the rest of the HPC infrastructure based on solutions already developed in previous and ongoing calls.

The quantum computers should have at least 10 qubits, with an average of 2-qubit gate error rate of less than 1%, or equivalently with a 2-qubit gate fidelity at least above 99%, and allow for a maximum circuit depth and number of entangled qubits by the installation date. The quantum computers should integrate EU technologies and uptake research outputs emanating from Quantum Flagship projects or from national research programmes of the EuroHPC Participating States. Applications to the call for expression of interest should clearly identify the technical features of the targeted quantum computer, including the quantum processing unit (qubits / individual quantum units, entanglement capability, control etc.) and the

integration (type interface, interconnection, software stack etc.) between the quantum computer and the rest of the EuroHPC infrastructure.

Therefore, the application to the call for expression of interest should include the request for a grant to cover the integration of the quantum computer with the supercomputer of the hosting entity, including the necessary developments of quantum hardware and the software stack. The grant for the integration of the EuroHPC quantum computers awarded to hosting entities should achieve the objective of a standardised application programming interface for software libraries and applications which is independent of the quantum computing technology. This will require coordination and collaboration with previous selected proposals. Moreover, proposals should build on or seek collaboration with existing projects and develop synergies with other relevant European, national or regional initiatives, funding programmes and platforms.

The application should also explain how access to the quantum computer integrated in the HPC system of the hosting entity will be implemented in agreement with the EuroHPC JU Access Policy. This is of particular importance for applications from entities where the ownership of the HPC system and the quantum computer will be different and the EuroHPC JU does not own HPC resources.

The selected hosting entities should ensure to the extent possible cooperation with complementary projects launched, notably in the area of the EuroHPC-2020-01-b: "Pilot on quantum simulator, EUROHPC-2022-CEI-QC-01 and EUROHPC-2023-CEI-QC-01. Successful applicants", should establish from the beginning of this cooperation appropriate IP exploitation agreements. They should also contribute to spreading excellence across Europe, notably through the involvement of participants from EuroHPC Participating States currently developing their HPC/quantum infrastructure and incorporating results emanating from the Quantum Flagship projects or national research programmes of the EuroHPC Participating States.

This action is an EU Synergy call. Grants and procurements can be linked with another grant funded from any other EU funding programme. The grants under both calls will be managed as linked actions.

Procurement and operation of the quantum computers for integration into HPC supercomputers

The EuroHPC JU will launch the procurement for the acquisition and operation of the quantum computers. The quantum computers will be hosted in the Hosting Entity selected in the Call for Expression of Interest EUROHPC-2024 - CEI-QC-01. The quantum computers should aim to incorporate to the maximum extent competitive European technology. The aim is to support multiple proposals with diversity in technology and applications, in order to give European HPC users access to as many different quantum technologies and applications as possible.

Pursuant to Article 12 of the EuroHPC JU Regulation, the EuroHPC JU will be the owner of the quantum computers. The Union's contribution from Digital Europe Programme (DEP) funds should cover up to 50% of the acquisition costs plus up to 50% of the operating costs of the quantum computer. The EuroHPC JU estimates that an EU contribution of up to EUR 10 Million and an equivalent EUR 10 Million MS contribution would allow for the acquisition, operation and integration of at least one quantum computer.

For security reasons and as the action is directly related to the Union's strategic autonomy, the participation of suppliers in the acquisition of the quantum computers should be conditioned in accordance with Article 12(6) of Regulation (EU) 2021/694, and in accordance with Article 18(4) of that Regulation. The quantum computers will be hosted in the hosting entities selected in the Call for Expression of Interest. The action should cover: (i) the acquisition of the quantum computers/simulators, (ii) their installation in the supercomputer environment of the hosting entity, (iii) the hardware and software integration with the HPC supercomputing infrastructure, (iv) the operation, maintenance and dismantling of the quantum computers.

Expected Outcome: Acquisition, installation, operation and maintenance of at least three quantum computers, and provision and management of access to these systems for a wide range of public and private users.

SPECIFIC CONDITIONS	
Expected EuroHPC JU contribution per project	The EuroHPC JU estimates that an EU contribution of between EUR 8 – 10 Million matched by a MS contribution of EUR 8 – 10 Million per quantum computer would allow for the acquisition and operation of at least one quantum computer covering different qubit technologies. Applications must ensure the operation of the quantum computer for at least 4 years after successful acceptance.
Indicative budget	The total indicative EU budget for the topic is EUR 10 Million. The total contribution will be EUR 20 Million.
Type of Action	Call for expression of interest
Eligibility conditions	The eligibility conditions are those established in the EuroHPC JU Council Regulation (EU) 2021/1173. The JU will act as first user and acquire quantum computers or simulators that integrate technology primarily developed in the Union or Norway and Iceland. Article 12.6 of the Digital Europe Programme will apply, whereby, in order to achieve the expected outcomes, and safeguard the Union's strategic assets, interests, autonomy, and security, it is important to avoid a situation of technological dependency on a non-EU source, in a global context that requires the EU to take action to build on its strengths, and to carefully assess and address any strategic weaknesses, vulnerabilities and high-risk dependencies which put at risk the attainment of its ambitions. Therefore, participation is limited to legal entities established in Member States that are members of the EuroHPC Joint Undertaking or Participating States Norway and Iceland. Proposals including entities established in countries outside the scope specified in the call/topic/action will be ineligible.

CONNECTED AND FEDERATED SUPERCOMPUTERS PILLAR

Ongoing activities:

Procurement of connected HPC infrastructure and services

On HPC connectivity, the JU will ensure that the Connectivity study procured in 2022 will be delivered in 2024. The results will be presented to the Governing Board and on the basis of this, the Governing Board will determine the type of action and funding in order to launch the implementation initiative before the end of 2023. On the basis of the study, the JU will procure Connected HPC infrastructure and services in 2024. The EuroHPC JU estimates that an EU contribution of EUR 60 Million from the CEF-2 funds allocated in Work Programme 2021 would allow for the procurement of a Connected HPC infrastructure and services.

SPECIFIC CONDITIONS: CALL FOR TENDER FOR THE DEVELOPMENT AND IMPLEMENTATION OF A CONNECTED HPC INFRASTRUCTURE AND SERVICES ACROSS ALL THE EUROHPC JU SUPERCOMPUTERS (CFEI 2023; CALL IN 2024)	
Expected EuroHPC JU contribution to the tender is 100%.	The EuroHPC JU estimates that an EU contribution of up to EUR 60 Million for the development of and implementation of a Connected HPC infrastructure and services across all the EuroHPC JU supercomputers.
Indicative budget	The total indicative budget for this initiative is EUR 60 Million
Type of Action Eligibility conditions	Procurement The eligibility conditions are those established in the EuroHPC JU Council Regulation (EU) 2021/1173 and the rules of the Connected Europe Facility Regulation (EU) 2021/1153. In order to achieve the expected outcomes, and safeguard the Union's strategic assets, interests, autonomy, or security, participation is limited, as stated in Article 11.4 of the Connected Europe Facility Regulation (EU) 2021/1153. Legal entities established in the Union but directly or indirectly controlled by third countries or nationals of third countries or by entities established in third countries, are not eligible to participate in all or some of the actions under the specific objectives set out in Article 3(2), point (c), for duly justified security reasons.

	In such cases, calls for proposals and calls for tenders shall be restricted to entities established, or deemed to be established, in Member States and directly or indirectly controlled by Member States or by nationals of Member States.

Procurement of Federating Supercomputers and services

In 2023, the JU launched a call for tender for the deployment and operation of a platform for federating resources (including high performance computing, quantum computing and data management resources) providing Union-wide, cloud-based secure services for a wide range of public and private users across Europe. This procurement was launched in 2023 and will be fully operational across all EuroHPC Hosting Entities by 2025.

TECHNOLOGY PILLAR

"HPC Technologies research and innovation must be state-of-the art and reinforce strategic sovereignty (as indicated in Council Regulation (2021/1173). Furthermore, they must guarantee early access to European technologies and lead in development of European IP. … The JU shall invest in HPC technologies, including General Purpose Processors, accelerators and networks/interconnects, that are developed through EuroHPC JU calls must pursue energy efficiency goals, be innovative, be able to perform and compete globally, be production ready and whenever feasible be ready to be deployed in industrial settings" MASP 2023

Ongoing Activities in 2024

EuroHPC JU is currently managing 20 grants which have been selected in call H2020-JTI-EuroHPC-2019-1 and focus mostly on technology. The portfolio includes, for example, the development of software for future European supercomputer architectures, a European high-speed interconnect and a RISC-V based processor. Most of these projects will end in early 2024. A review of the different results and activities that have been delivered will be undertaken in 2024, in order to determine progress to delivering the objectives as set out in Regulation 2021/1173 and planning for future work programmes.

The JU launched a ***FPA RISC-V call*** *in 2023.*

A Pre-Commercial Procurement (PCP) focused on the development of European technology and their integration in pilot systems that demonstrate a significantly reduced energy footprint for typical expected workloads on EuroHPC systems. The action addresses R&D towards a technology readiness level (TRL) which delivers tangible solutions ready for procurement on a larger scale and within a timeframe of 2 years by the end of the action. Central selection criterion will be the expected benefits of the developed technology after scale-up to at least the size of current mid-range supercomputers. The PCP will be followed by a Public Procurement of Innovative solutions (PPI) to procure a system using the best developed solutions.

A call was launched **on *Innovation Action in Low Latency and High Bandwidth Interconnects*** which will, efficiently exploit the increasing available computation capabilities, inter-node networking (interconnect between compute nodes) in exascale and post-exascale systems.

The JU launched the ***HPC Energy efficiency R&I Call*** to develop new technologies that will reduce the energy consumption of future EuroHPC supercomputers.

Calls 2024:

Specific Grant Agreement (SGA) for the 1st Phase of the Framework Partnership Agreement with the DARE consortium for developing a large-scale European initiative for High Performance Computing ecosystem based on RISC-V

HORIZON-EUROHPC-JU-2024-DARE-SGA-04

Scene Setter:

In line with its mission[3] and strategic programme[4], the EuroHPC JU addresses European microprocessor technologies for HPC. The EuroHPC JU has selected the DARE consortium in 2023 to establish a Framework Partnership Agreement (FPA) for developing a large-scale European initiative for a High-Performance Computing (HPC) ecosystem based on RISC-V (HORIZON-EUROHPC-JU-2022-TECH-03). This FPA represents a stable and structured long-term partnership with the DARE consortium for implementing a European strategic and ambitious R&I initiative focusing on the development of an innovative HPC hardware and software, processor and accelerator technology, and ecosystem based on the RISC-V open standard instruction set architecture. The development of European processors and accelerators should prepare the technology for its future integration in post-exascale supercomputers to be acquired at a later stage by the EuroHPC JU targeting systems incorporating European technologies.

The FPA ensures the implementation of the initiative through Specific Grant Agreements (SGAs) that will implement the different proposed technology roadmap activities. The DARE consortium is invited within the FPA to submit a Research and Innovation Action (RIA) for the 1st phase of research activities and roadmap defined in the FPA.

Expected Outcome:

- European capabilities in designing, developing, and producing IP related to high-end processors and accelerators based on RISC-V.
- A family of energy efficient high-end processors and accelerators for HPC based on RISC-V hardware and chiplet solutions, testbeds, and at least one prototype/pilot integrating these processors/accelerators.
- A vertically integrated software stack, including key elements such as programming models and runtimes (e.g. languages, compilers, programming environments, communication), libraries (e.g. mathematical, data analytics, AI frameworks), tools (e.g. debuggers, performance, system monitoring), operating system components (e.g. schedulers, workflows, software management, firmware, drivers, security), and other elements (e.g. for networking, software deployment, system-level composability and modularity of software, etc.).
- A small set of critical HPC applications ported and optimised for the new RISC-V based environment, based on a co-design approach.
- Interface specifications for the software and hardware stack, with clear definition of standardization and licensing schemes of the developed Intellectual Property (IP), with mechanism to guarantee that this IP remains in the EU.

[3] Council Regulation (EU) 2021/1173 of 13 July 2021 on establishing the European High Performance Computing Joint Undertaking and repealing Regulation (EU) 2018/1488, http://data.europa.eu/eli/reg/2021/1173/oj

[4] EuroHPC JU Decision No 8/2023 https://eurohpc-ju.europa.eu/system/files/2023-06/Decision%2008_2023_%20Amendment%20MASP%202021-2027_0.pdf

- An agile product roadmap with a critical timeline, milestones and all the necessary activities that would be needed to guide the beneficiaries towards building and deploying post-exascale systems in Europe, using predominantly European technology.

Scope: The DARE consortium is invited to submit a Research and Innovation Action (RIA) proposal for the 1st phase of research activities and roadmap defined in the FPA.

1. The proposal for the 1st phase of DARE will cover the design and development of European processors, accelerators and related technologies for extreme-scale, high-performance big-data, and emerging applications, in accordance with the research roadmap defined in the FPA. The proposal should leverage software/hardware co-design to achieve the next levels of performance and efficiency in RISC-V based HPC. The proposed work should target performance levels, supported by appropriate KPIs, competitive to non-EU solutions by the end of the DARE initiative.
2. The aim of this SGA is to design and deliver energy efficient high-end tape-outs of a general-purpose processor and of two accelerators, an Artificial Intelligence (AI) Accelerator and a Vectorial Accelerator, for HPC based on RISC-V silicon and chiplet solutions with advanced memory interfaces.
3. The proposed action should cover the design, testing and development of these three high-end processors and their integration in a pilot system in view of their roll-out, uptake and use in world-class competitive supercomputers.
4. The proposed action should also develop a functional RISC-V software stack, including key elements such as programming models, runtimes, libraries, tools, and operating system components.

The different lines of activity under consideration must be aligned, interact between themselves, and ensure reinforced cooperation and integration that result in continuous enhancements.

In particular, the proposal should cover the following points:

1) Hardware development Technical Areas:

a) General-Purpose CPU: Design and development of a high-end general-purpose CPU based on RISC-V. The design should represent an evolution of already existing European RISC-V designs. The target of the design should be to provide scalable and customisable high-performance RISC-V multi-core and multi-cluster CPU implementations delivering feature and cost competitive power-performance-area metrics. The CPU ought to deliver high performance over a wide range of HPC applications featuring combinations of both parallel and sequential code. Special attention should be given to the optimisation of the memory system bandwidth at all levels. The proposed work must target KPIs comparable to non-EU solutions and be feature and price competitive and energy efficient. A detailed comparison with other solutions including monolithic CPUs, chiplet-based CPUs, and closed-source proprietary CPU IP from non-EU providers should be presented.

b) Artificial Intelligence (AI) Accelerator: Design and development of a high-end RISC-V based accelerator designed for the efficient processing of AI workloads and

applications. The design should be an evolution of existing European AI accelerator designs. Examples of applications that should be covered are AI-driven approximations of computationally expensive simulations (trained on existing data from full-scale HPC simulations), large transformer-based language models, massive neural networks, etc. A key challenge is to balance computational performance with energy efficiency. The proposed work must target KPIs comparable to non-EU solutions and be competitive on price/performance and energy efficiency.

c) Vectorial Accelerator: Design and development of a high-end RISC-V based vectorial accelerator. The design should be an evolution of existing European vectorial accelerator designs. Capabilities should include high floating-point density, long vector and matrix architecture and wide data path. The applications targeted should include current and future HPC workloads requiring operations using 64-bit double precision floating-point support and other data types. The proposed work must target KPIs comparable to non-EU solutions and be competitive on price/performance and energy efficiency.

All software and hardware development technical areas should be industrially/commercially driven and use chiplet-based approaches providing mix-and-match customisation capabilities to address varying high-end computing workload requirements. They should target the realisation of initial tape-outs of at least 7nm withing the timeframe of the first RIA. The node selection should be done based on a thorough cost/benefit analysis and corresponding industrial and market perspectives. Moreover, the consortium should indicate the advantages and disadvantages of using the target fabrication processes, assess the availability of relevant IP, availability of design tools, licenses, and also their resources and capabilities. The required EDA tools and IP should be described in detail and the timeline of the obtained licenses and cost should be detailed. EDA training requirements, availability, and experience of relevant engineering resources, etc should be taken into account.

RTL-freeze should be targeted for month 18. At this point, before moving to tape-out, the EuroHPC JU will assess the KPI5 achievements/projections including a competitive assessment with regards to non-EU solutions worldwide for each hardware development activity and decide whether a particular technological development should be continued or halted. A single mask-set for all chiplets should be considered to reduce tape-out costs. A detailed plan to synchronise the chiplets resulting from the hardware developments should be provided and a private shuttle with a single mask set should be preferably created.

2) **Applications and Software Technical Area**:

- Develop an optimised HPC software stack for the hardware development technical areas. The software stack should support single nodes as well as large configurations.

[5] The EuroHPC JU and the Consortium at the beginning of the action will define the KPIs and acceptance criteria in each technical area according to industrial standards.

- Develop a hardware-software co-design simulation framework to facilitate native hardware support to application requirements.
- Port at least 3 realistic applications to the new hardware platforms. The selection of applications should be justified in detail with respect to coverage of projected future HPC workloads.

3) <u>Pilots Technical Area</u>

- Build / Upgrade Software Development Vehicles to support the Applications and Software technical area until actual silicon from the project is available.
- Once the projects' silicon is available, integrate the results from the hardware development technical areas in testbeds and at least one prototype/pilot in pre-operational environments in supercomputing centres for user testing and validation.
- Pilots with non-EU RISC-V off-the-shelf components are explicitly out of the scope of this initiative.

<u>Management and Coordination</u>: The proposal should implement a professional industrial project management approach. It should include an industry technical coordination group, consisting of the key industrial partners in the SGA, for closely overseeing technical progress in all the industrial activities related to the development of the proposed project's hardware solutions, tightly coordinating these activities and assisting the coordinator with the strategic decisions and orientations of the proposed project, including the R&I roadmap to implement the activities. The industry technical coordination group should maintain an up-to-date risk register with clear mitigation actions and escalation procedures.

In particular:

- The proposal should give a full product roadmap of how the HPC hardware developed through DARE will be competitive with current and future hardware coming from the worldwide competitors. This roadmap should be updated dynamically as necessary. The roadmap should include a description of all the activities that will be needed to build and deploy post-exascale systems in Europe based on the technology developed in the project.
- The proposal should demonstrate the capacity and industrial commitment of the partners for carrying out and sustaining the technical development and maintenance as well as effective marketing and business development. It should include convincing plans for industrial exploitation of the targeted technology developments and long-term market perspectives.
- The role of each partner in the proposed project should be described in detail. The number of the partners should be limited to the ones necessary for the achievements of the goals of the SGA. The partners should describe how soon after signing the SGA they would be able to allocate resources to the project and how many additional resources would need to be recruited, and what is the estimated onboarding process timeline. The potential for long-term cooperation among partners should be described.
- The proposal should include a preliminary analysis of barriers to market entry and appropriate mitigation procedures. Additionally, it should provide the potential impact to the project.

- The proposal should include an end-user advisory board, consisting of a representative set of private and public end users, to provide the user requirements and additional guidance to the proposed project on its co-design activities related to the targeted processor and accelerator technology.
- The proposal should provide for appropriate progress control mechanisms by establishing meaningful common milestones and KPIs to monitor the progress of the different work streams towards the goals of the overall initiative, and continuously monitor the current state-of-the art and comparing it with the state of the RISC-V General Purpose Processor (GPP), Vector Accelerator, and AI Accelerator. In particular, the proposal should foresee an intermediate major milestone at month 18 (before tape-out) for a critical assessment of the project's progress against the objectives and time-plan. The proposal should plan monthly monitoring meetings between the JU and the project's management team.
- The proposal should describe in detail the mechanisms to guarantee that all IP generated in the initiative will stay in the EU. IP management should be submitted with a clear plan of how key IP would remain in EU and not shared with non-European entities.
- The proposal should give a detailed description of preceding work in European projects by the partners, in particular the baseline of the technology developed in those prior projects, how the outputs from those projects will impact upon the proposal, and the will to license such technology to the FPA partners under reasonable terms and conditions.
- The synergies with the ETP4HPC Strategic Research Agenda and the HiPEAC Vision should be provided.
- The proposal should provide a plan on how the consortium will establish interaction with the relevant stakeholders and RISC-V projects of the Chips JU to coordinate work on horizontal issues common to both communities and exploit synergies where relevant.

Form of Funding: Grants not subject to calls for proposals

Type of Action: Specific grant agreement awarded without call for proposals in relation to a Framework Partnership Agreement

Indicative timetable: Second quarter of 2024

Indicative budget: up to EUR 240 million with 50% EU funding rate (up to EUR 120 million EU funds)

HORIZON-EUROHPC-JU-2024-DARE-SGA-04

Specific Grant Agreement (SGA) for the 1st Phase of the Framework Partnership Agreement with the DARE consortium. The DARE consortium is invited to submit a proposal to the following topic:

Topic	Type of Action	Budgets (EUR million)	Expected EU contribution (EUR million)[6]	Indicative number of projects expected to be funded
		2024		
Opening: XX YY 2024 Deadline(s): ZZ WW 2024				
HORIZON-EUROHPC-JU-2024-SGA- XXX-YY:	HORIZON-JU-RIA	240.00	Up to 120.00	1
Overall indicative EU budget		240.00		

Specific Grant Agreement (SGA) for the 1st Phase of the Framework Partnership Agreement with the DARE consortium	
General conditions	
	The call, including evaluation and award procedures, will be managed according to and the proposals should comply with the call conditions below and with the General Annexes to the Horizon Europe Work Programme 2023-2025 that shall apply mutatis mutandis to this call (with the exceptions introduced in the specific topic conditions). The conditions are described in Annex A of the General Annexes to the Horizon Europe Work Programme 2023-2025 which apply mutatis mutandis to the actions covered in this Work Programme. Eligibility conditions: The conditions are described in General Annex B. Financial and operational capacity and exclusion: The criteria are described in General Annex C. Award criteria: The criteria are described in General Annex D. Documents: The documents are described in General Annex E.

[6] Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

	Evaluation Procedure: The procedure is described in General Annex F. Legal and financial set-up of the Grant Agreements: The rules are described in General Annex G. If a topic deviates from the general conditions or includes additional conditions, this is explicitly stated under the specific conditions for the topic.
Specific conditions	
Expected EU contribution per project	There will be only one SGA project. The EuroHPC JU estimates that an EU contribution of maximum EUR 120 million would allow these outcomes to be addressed appropriately. The expected duration of this action is 3 years. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Type of Action	Research and Innovation Actions
Admissibility conditions	The conditions are described in Annex A. The following exception applies: The page limit of the application is 100 pages.
Eligibility conditions	Partners of the SGA proposal must be members of the DARE FPA
Legal and financial set-up of the Grant Agreements	As an exception from General Annex G of the Horizon Europe Work Programme, the EU-funding rate for eligible costs in grants awarded by the JU for this topic will be up to 50% of the eligible costs. In case a Participating State decided to entrust the EuroHPC Joint Undertaking with the management of its national contributions, this funding rate will be increased by the additional national funding rate for the eligible entities of this country. Beneficiaries will be subject to the following additional dissemination obligations: Beneficiaries will be subject to the additional exploitation obligations requiring that first exploitation of the results takes place in the European Union and the Participating States of the EuroHPC Joint Undertaking. Applicants must acknowledge this requirement in the

	proposal and Annex I to the Grant Agreement. Where justified, the grant agreement shall provide for the right for the EuroHPC JU to object to transfers of ownership of results, or to grants of an exclusive licence regarding results, if: (a) the beneficiaries which generated the results have received Union funding; (b) the transfer or licensing is to a legal entity established in a non-associated third country; and (c) the transfer or licensing is not in line with Union interests.

Enhancing competitive European microprocessor technology for HPC

The support for a sustainable and competitive exascale HPC ecosystem in Europe requires further action on the technology supply to develop extreme scale, power-efficient and highly resilient HPC and data technologies, contributing to the European digital autonomy and independent access to critical technology. This action should ensure complementarity to the Framework Partnership Agreement (FPA) for developing a large-scale European initiative for High Performance Computing (HPC) ecosystem based on RISC-V.

Proposals should be based on worldwide state-of-the-art processor developments which are a credible alternative to existing non-EU solutions for processors (and accelerators). Proposals are expected to be industry driven and deliver by the end of the project competitive solutions/systems proven in operational environments.

The objective is to provide scalable and customisable high-performance multi-core and multi-cluster processors implementations delivering competitive power-performance-area metrics. Expected work should build and rely on existing EU achievements and initiatives like for example the European Processor Initiative. The proposed action should cover the design and testing of and development of a high-end processors and integration in pilot systems in view of their roll-out, uptake and use in world-class competitive supercomputers.

The proposed work should target KPIs that will outperform non-EU solutions. A key aspect is to ensure that all the IP necessary to produce the solutions remains in the EU, effectively creating an independent European source of critical technology.

Indicative Budget:

An indicative budget will be allocated from the Horizon Europe of EUR 48.6 Million

An EU contribution of EUR 48.6 Million (50% of total funding) will be matched by a PS contribution of EUR 48.6 Million (50% of total funding).

SPECIFIC CONDITIONS	
Expected EuroHPC JU contribution per project	The EuroHPC JU estimates that an EU contribution of 48.6 Million matched by a MS contribution of EUR 48.6 Million
Indicative budget	The total indicative EU budget for the topic is EUR 48.6 Million. The total contribution will be EUR 97.3 Million.
Type of Action	Grant, Horizon Europe.
Eligibility conditions	In accordance with article 22.5 of the Horizon Europe Programme, and in order to achieve the expected outcomes, and safeguard the Union's strategic assets, interests, autonomy, and security, it is important to avoid a situation of technological dependency on a non-EU source, in a global context that requires the EU to take action to build on its strengths, and to carefully assess and address any strategic weaknesses, vulnerabilities and high-risk dependencies which put at risk the attainment of its ambitions. Therefore, participation is limited to legal entities established in Member States that are members of the EuroHPC Joint Undertaking or Participating States Norway and Iceland. Proposals including entities established in countries outside the scope specified in the call/topic/action will be ineligible.

Broadening EuroHPC's Quantum Ecosystem: Enabling Universal Access and Integration of Quantum Resources (local and remote) as HPC Accelerators

Background: This call for proposals targets emerging paradigms in quantum computing and high-performance computing integration. It introduces enhanced concepts of 'Universal Quantum Access' and 'Quantum Accelerators in HPC', with the aim of ensuring all-encompassing integration, operation, and access to diverse quantum computing resources within and beyond the EuroHPC network, using all possible means of access.

Objectives:

- To facilitate global access and utilization of diverse quantum computing resources within the EuroHPC framework, using all possible means of access.
- To enable seamless integration of quantum computers as accelerators in HPC workloads.
- To foster innovation and efficiency in leveraging quantum resources for advanced computational tasks, ensuring that EuroHPC facilities are used as effectively as possible.
- Mature cloudified access to quantum computing resources.

1. Implement universal access to local and remote QCs through resource managers/schedulers:

- Enable supercomputers to launch activities employing one or multiple local or remote quantum computers, enhancing the diversity and efficiency of computational tasks.
- Integrate advanced scheduling capabilities within resource managers/schedulers to efficiently allocate and utilize local or remote quantum resources in computational workloads.
- Develop and implement standardized interfaces and protocols for integrating quantum resources as accelerators in HPC workloads.

2. Expand secure quantum cloud platform:

- Widen access to quantum computers through a robust and secure cloud platform, enhancing accessibility and utilization.
- Further enhance the EuroHPC Quantum Cloud platform for secure and seamless access to diverse quantum computing resources.
- Establish secure and efficient communication networks and collaboration platforms for leveraging distributed quantum resources.
- Ensure that the expanded quantum ecosystem maintains the highest standards of security and operational efficiency.

3. Focus on specific applications:

- Identify and prioritize applications (such as quantum simulation, cryptography, and optimization) that may not require extensive classical computing resources but can significantly benefit from access to quantum computing resources.

Expected Outcomes:

- Universal access and integration of diverse local or remote quantum computing resources within the EuroHPC network.
- Enhanced efficiency, performance, and innovation in leveraging quantum resources for advanced HPC workloads.
- Strengthened and secure quantum ecosystem, promoting collaborative advancements and applications.

For security reasons and as the action is directly related to the Union's strategic autonomy, the action should be conditioned in accordance with Article 22.5 of Horizon Europe of Regulation.

One single grant will be selected.

SPECIFIC CONDITIONS	
Expected EuroHPC JU contribution per project	The EuroHPC JU estimates that an EU contribution of 10 Million matched by a MS contribution of EUR 10 Million

Indicative budget	The total indicative EU budget for the topic is EUR 10 Million. The total contribution will be EUR 20 Million.
Type of Action	Grant, Horizon Europe.
Eligibility conditions	In accordance with article 22.5 of the Horizon Europe Programme, and in order to achieve the expected outcomes, and safeguard the Union's strategic assets, interests, autonomy, and security, it is important to avoid a situation of technological dependency on a non-EU source, in a global context that requires the EU to take action to build on its strengths, and to carefully assess and address any strategic weaknesses, vulnerabilities and high-risk dependencies which put at risk the attainment of its ambitions. Therefore, participation is limited to legal entities established in Member States and Norway, Iceland and Israel. Proposals including entities established in countries outside the scope specified in the call/topic/action will be ineligible.

Development of new benchmarks for HPC, Quantum Computing, and AI

Expected Outcome:

The action will provide three sets of well documented, generally hardware agnostic benchmarks for exascale HPC, quantum computers and AI specific technology. The benchmarks will be application oriented, reflecting real use patterns to ensure the real capabilities and limitations of advanced HPC systems are captured. Based on the set of standardised tests, aggregated performance indicators can be defined to link system performance with real value for the targeted user communities.

Scope:

- Identification of suitable applications and algorithms in the three areas
- Selection of a representative set of applications and algorithms reflecting real use cases
- Develop reference implementations of algorithms where necessary
- Provide the required input and output data to run benchmarks
- Provide documentation for developers and users of the resulting benchmarks
- Coordinate with international collaborators as appropriate to establish common and objective benchmarking standards
- In Quantum, benchmarks will take into account specific problems covering optimization, machine learning, cryptography, material science, and should span various levels of quantum computing readiness, from NISQ to fault-tolerant quantum computing regimes.

Indicative Budget:

An indicative budget will be allocated from the Horizon Europe of EUR 10 Million. An EU contribution of EUR 10 Million (50% of total funding) will be matched by a PS contribution of EUR 10 Million (50% of total funding).

HPC/Quantum Computing Middleware technologies

Expected Outcome:

This action should build upon the HPC-QC integration efforts carried out in the HPCQS project and by the EuroHPC Hosting Entities of quantum computers.

Scope:

The developed reference software stack should, as far as technically feasible, expose a common and technology agnostic interface to developers of applications, resource management software and system management and monitoring tools, in line with existing and established standards and contribute to the European standardization efforts.

The Action will implement mechanisms to establish a dialogue between the relevant European suppliers of QC technology, HPC operators and software developers.

The activities developed in this Action should also address in particular the challenges of scheduling of QC tasks, HPC-QC application development, system and user management and monitoring.

Indicative Budget:

HE (WP24): A total EU budget of EUR 20 Million to fund projects with a duration of 3 years.

An EU contribution of EUR 20 Million (50% of total funding) will be matched by a PS contribution of EUR 20 Million (50% of total funding).

APPLICATIONS PILLAR

Ongoing Activities:

The EuroHPC JU Centres of Excellence selected in early 2023 will have their first review in 2024. The latest HPC Centres of Excellence selected in 2023 will begin operations in 2024. The European Quantum Excellence Centres (QECs) in applications for science and industry, launched in 2023 and the evaluations will take place in 2024. The EuroHPC Inducement Prize for Quantum Computing and Simulation Applications, which appears in Work Programme 2023, will be launched in 2024.

Calls 2024

As announced in President Von der Leyen in her State of the Union speech on 13 September 2023, Europe should lead global efforts on artificial intelligence. To do this, the EU will leverage one of its biggest assets: its public high-performance computing infrastructure.

In order to promote innovation in AI responsibly, EuroHPC computing power will be used to train and finetune the most advanced foundation models, as well as advances applications and software. The EU's mission is to lead global efforts on artificial intelligence and guide innovation. Access to Europe's supercomputing infrastructure will help start-ups, researchers and other users bring down the training time for their newest AI models from months or years to days or weeks. And it will help them lead the development and scale-up of AI responsibly and in line with European values. EuroHPC JU's strategy in 2024 will therefore include development of applications and software tools and techniques to support the Hosting Entities and of course, users.

AI Software Ecosystem for HPC

Expected Outcome:

Methodologies, programming environments and software stack (libraries, tools, workflows, etc.) facilitating the coupling of HPC with AI training processes and big data (e.g. for LLM), including:

- Development of HPC workflows supporting the parallelisation of AI applications for optimising the use of HPC capabilities, and their deployment in HPC systems
- Dynamically supporting scalability of AI and AI Data
- Generic reusable and transversal solutions across domains (no ad-hoc)
- Architecture agnostic and reflecting performance optimisation and energy efficiency in HPC systems
- Supporting AI-friendly features (e.g. interactivity, access to different large data sets, HPC elasticity, aggregation of many small jobs, etc.)
- Integration in EuroHPC federated services
- Complementary to the AI-oriented Support Centre

Indicative Budget:

An EU contribution from the Horizon Europe Programme of EUR 8 Million (50% of total funding) will be matched by a PS contribution of EUR 8 Million (50% of total funding).

HPC Applications

Expected Outcome:

- Applications to support the efficient use of exascale resources. The developed application targets real needs and use cases of significant impact where exascale supercomputers are required, e.g., AI, big data, machine learning, cybersecurity, conflict simulations, social sciences, challenges in transport and logistics, construction.
- Pooled expertise to support application development in Europe by providing common library and software components, frameworks and tools which facilitate and optimise the development and execution of complex and computationally intensive tasks at exascale.
- Enhanced performance, scalability, reliability and efficiency of HPC applications while reducing the development effort by development and adoption of common software libraries
- Significant improvements in the target software and codes, in terms of e.g. efficiency, scalability, refactoring, adaptation to new software engineering and programming environments and tools, and optimisation for novel HPC hardware and system software.
- Contribution to the adoption of modular design principles and to the interoperability of software components across applications

Scope:

This Action will focus on HPC applications and software libraries for the exascale era. Proposals should:

- Demonstrate advances of the targeted HPC applications towards highly scalable, optimised flagship codes and exascale performance (both computing and extreme data). This includes developing, maintaining, porting, optimising (if needed re-designing) and scaling HPC application codes, addressing the full scientific/industrial workflow, particularly covering data aspects; testing and validating codes and quality assurance.
- Develop HPC libraries, software components, frameworks and tools using state-of-the art programming models to achieve unprecedented performance, robustness and reliability. Extract, collect, adapt and consolidate common code from European HPC applications into a common library promoting modular design principles and standardisation for both scientific and industrial applications.
- Present a detailed software development plan and management plan with clear timeline for the implementation including quantitative KPIs, milestones and deliverables demonstrating the achieved improvements. This also includes acceptance test after every significant development part. The software development plan with concrete scaling targets, covering the identified application and codes, should be

central to the proposed work and most resources should be allocated to these activities.

- The software should be deployed at all EuroHPC systems. The continuous deployment and continuous integration of the software on EuroHPC machines should be included as soon as possible in collaboration with the EuroHPC CI/CD platform.
  This action provides complementary grants to other initiatives such as HORIZON-EUROHPC-JU-2021-COE-01, HORIZON-EUROHPC-JU-2023-COE-01, HORIZON-EUROHPC-JU-2023-COE-03. Applications and codes funded by these actions are excluded from funding.

Indicative Budget:

An EU contribution from the Horizon Europe Programme of EUR 10 Million (50% of total funding) will be matched by a PS contribution of EUR 10 Million (50% of total funding).

Centres of Excellence to support the development of exascale applications

Scope

Adapting applications to exascale and future post-exascale performance is a major challenge that requires significant changes in application codes, in some cases involving a complete rethink or substantial code re-engineering and rewrite. Action at European level is needed to support this transition in collaboration with the relevant communities that are key for the evolution of the codes. Changes to support the exascale transition have to take into consideration the heterogeneity of most architectures, code scalability and resilience, and the management of complex workflows at exascale.

Centres of Excellence are advancing specific Lighthouse Exascale Applications, at the frontier of technology and relevant for the communities of HPC users, that enable and promote the use of upcoming exascale and post exascale computing capabilities in collaboration with other High Performance Computer (HPC) stakeholders**.** The action will address topics of strategic importance for the Union, which will be identified by the JU in 2024 and could address elements such as**:**

- Combustion
- Aeronautical Design
- Virtual Pre-clinical trials:
- Foundation Models for Science

Other topics could also be considered as long as there is no overlap with topics already covered in ongoing projects being undertaken in EuroHPC JU Centres of Excellence.

Indicative Budget:

An EU contribution from the Horizon Europe Programme of EUR 10 Million (50% of total funding) will be matched by a PS contribution of EUR 10 million (50% of total funding).

Call on HPC/Cybersecurity/AI

Scope

High-Performance Computing (HPC) is no longer a niche for compute-intensive simulations. Instead, we are witnessing an era where users leverage HPC to process large amounts of data, train highly-complex artificial intelligence (AI) models, and anywhere where HPC plays a vital role along the compute continuum. The convergence of HPC and AI has expanded the HPC domain into a comprehensive ecosystem, creating opportunities and challenges for various industries such as engineering or the automotive sector. As a consequence, the previously manageable domain of HPC enfolds into an entire ecosystem precisely due to the convergence with AI. There is no longer solely the risk that an attack gains access to the computing power but also gets access to privacy-sensitive data stored more often within the HPC ecosystem. There is also the need to integrate HPC next to Cloud and Edge along the compute continuum to seamlessly execute complex workflows.

While the risks and vulnerabilities of HPC systems are often under-represented in today's security conversations, the convergence of HPC and AI increases the importance of HPC systems as critical infrastructures as more diverse user communities exploit and integrate with HPC systems. However, with the convergence of HPC and AI comes an increased concern for security. The European HPC infrastructure will be prone to a cyber-attack's target. Proposals for this topic shall therefore investigate cybersecurity requirements for secure access and usage of HPC systems while strengthening the security of the European HPC landscape.

Expected Impact

Companies from sectors such as finance, healthcare, manufacturing, and energy are utilizing HPC to tackle data-driven challenges, optimize processes, and gain valuable insights from large-scale data analysis. The support from these industries underscores the growing importance of HPC across the compute continuum, and thus requires to guarantee highest security policies.

Projects funded under this topic will therefore contribute to the EU Cybersecurity Strategy by increasing cybersecurity for critical infrastructures supporting "protection of data and networks aspiring to technological sovereignty in this field, while respecting privacy and other fundamental rights; this should contribute to secure services, processes and products, as well as to robust digital infrastructures capable to resist and counter cyber-attacks and hybrid threats. This action will be implemented in line with relevant EU cybersecurity legislation.

More specifically, proposals shall contribute to one or more of the following impacts:

- Enhance risk reduction of cyber-attacks on critical EuroHPC infrastructures.
- Resist and counter cyber-attacks and hybrid threats on EuroHPC infrastructures.
- Improve methods for HPC cybersecurity testing, certification, and standards.
- Shared cybersecurity management in supercomputing Centres and culture among HPC users

Expected Outcome

Current and future HPC ecosystems must therefore guarantee cybersecurity requirements across several layers: hardware, software, applications, data, internal staff (e.g., system administrators and performance engineers), and users. Thus, projects will assess and implement instruments (e.g., technologies, policies, tools) and derive solutions to secure the HPC ecosystems.

Projects' results are expected to contribute to some or all of the following outcomes:

- Awareness and training of HPC users on security-related topics such as security-aware software development
- Seamless integration of security into typical HPC applications to increase robustness against threats without or minimally affecting the applications' performance
- Demonstrate secure interoperability and integration of HPC into the compute continuum
- Actively engage industry stakeholders, and fostering collaboration, to pave the way towards secure and resilient critical European HPC infrastructures
- Secure mechanisms addressing authentication and authorization, secure data transfer, processing and storage of privacy-sensitive data
- Mechanisms to securely continue or resume production after attack detection
- Real-time threat prediction and identification (e.g., unauthorized access, data breaches, viruses, malicious workloads or insider threats)

Proposals shall make of use of latest technologies including artificial intelligence (e.g., smart and automatic prediction and identification of threats), cryptography (e.g., on-the-fly encryption), cloud computing (e.g., virtualization or containerization), or quantum computing, to achieve the expected outcomes.

In accordance with article 12.6 of the Digital Europe Programme, and in order to achieve the expected outcomes, and safeguard the Union's strategic assets, interests, autonomy, and security, it is important to avoid a situation of technological dependency on a non-EU source, in a global context that requires the EU to take action to build on its strengths, and to carefully assess and address any strategic weaknesses, vulnerabilities and high-risk dependencies which put at risk the attainment of its ambitions. Therefore, participation is limited to legal entities established in Member States that are members of the EuroHPC Joint Undertaking or Participating States Norway and Iceland. Proposals including entities established in countries outside the scope specified in the call/topic/action will be ineligible.

Indicative Budget:

An EU contribution of EUR 5 Million over 3 years from the Digital Europe Programme (50% of total funding) will be matched by a PS contribution of EUR 5 Million (50% of total funding).

Continuous integration and deployment platform (CI/CD)

Expected Outcome:

This Action will provide users with access to a continuously updated, with improved efficiency, software stack. This Action will boost R&I, contribute to the reliability of numerical results,

save energy and resources and ensure the security of the EuroHPC infrastructure. The use of the CI/CD platform will also contribute to establishing best practices in software development and overall better visibility of the investments in HPC applications by the Union. By the end of the action, a broad and representative portfolio of HPC applications developed by the European HPC communities will be available to users at all EuroHPC systems, enabling the execution of computations on any system using the same version of an application and, hence, a seamless and reliable transfer of workflows.

Scope:

This Action will develop an HPC Software Stack in the form of a common platform.

It will build on the pilot for a EuroHPC CI/CD platform for HPC applications which is currently developed by the European Centres of Excellence for HPC Applications. The technical implementation should ensure the most efficient use, in terms of application performance and energy consumption, of the available hardware by the deployed software.

The development and operation of a common continuous integration and deployment platform to deploy for applications to EuroHPC systems will ensure all users have access to the latest releases and experimental development versions of software. This action is complementary to the Application Support Teams funded by EuroHPC (call DIGITAL-EUROHPC-JU-2022-APPSUPPORT-01) who are expected to provide system specific support at the EuroHPC Hosting Entities for the integration of the CI/CD platform in the local system environment and related deployment, testing and benchmarking workflows.

Indicative Budget:

An EU contribution from the Digital Work Programme of EUR 5 Million (100% funding rate) over 5 years with the option to award small grants (up to EUR 60k) to application development teams for onboarding on the platform.

COMPETENCES AND SKILLS PILLAR

Ongoing activities:

In 2023, the new Competence Centres were established. The EUMaster4HPC Master programme will be in its 3rd year. More institutions will take part in the courses and more students will be recruited. In the summer of 2023, the first cohort of students (17 students) will have completed their first year.

Two calls, EuroHPC International HPC Summer School and the EuroHPC Training Platform addressing training and skills in HPC in academia and job placements in HPC sector were launched in 2023, and two proposals were selected. They will become operational in 2024.

EuroHPC Virtual Training Academy was launched in 2023.

The first User Day took place in December 2023.

Calls in 2024

Renewal of the EuroHPC Masters Programme

Expected Outcome:

The Purpose of this call is to continue and further develop the European MSc programme in High Performance Computing.

Scope:

The MSc programme should focus on academic excellence and bridge the gap to professional career paths by collaborating with the European HPC industry and academia.

Proposals should adopt the existing modular training portfolio and contribute to its standardization, certification and systematic extension. A central objective is to significantly increase the visibility of the programme among target groups and attract outstanding students with a geographically balanced intake. The programme should support the graduation of at least 100 students, provide financial support for mobility and compensation of differences in living costs. Students should change university and country as they enter the programme.

Indicative Budget:

An EU contribution from the Digital Europe Programme of EUR 10 Million for a duration of 4 years (100% EU funded)

2nd National Competence Centre Call:

DIGITAL-EUROHPC-JU-2024-NCC-02-01: National Competence Centres for High Performance Computing

Call - National Competence Centres for High Performance Computing: DIGITAL-EUROHPC-JU-2024-NCC-02

Overview of this call

Proposals are invited against the following Destinations and topic(s):

Topics	Type of Action	Budgets (EUR Million)	Expected EU contribution per project (EUR Million)	Indicative number of projects expected to be funded
Opening: 20 Mar 2024 Deadline(s): 23 Apr 2024				
DIGITAL-EUROHPC-JU-2024-NCC-02-01: National Competence Centres for High Performance Computing	DIGITAL-JU-SIMPLE	Up to 10	Up to 5	1
Overall indicative budget		Up to 10		

General conditions relating to this call

Proposals are invited against the following topic(s):

DIGITAL-EUROHPC-JU-2024-NCC-02-01: National Competence Centres for High Performance Computing

SPECIFIC CONDITIONS	
Type of Action	DIGITAL JU Simple Grants
Expected EuroHPC JU contribution per project	The EuroHPC JU estimates that an EU contribution of up to EUR 5 Million matched by a PS contribution of up to EUR 5 Million (50% EU funding rate) would to allow these outcomes to be addressed appropriately. The expected duration of this action is up to 21 months with an EU contribution of up to EUR 600,000 per National Competence Centre.

Expected Outcome: This action will extend the existing network of National Competence Centres for HPC (NCCs) currently funded by the EuroHPC JU in the EuroCC 2 project by additional National Competence Centres in EuroHPC Participating States that currently do not receive financial support for a NCC. The NCCs will be fully aligned with and integrated into the EUROCC 2 network, its management structure, reporting lines and the CASTIEL 2 Coordination and Support Action. By the end of the action, an effective support network in

the field of HPC will have been established providing services to local communities from the public and private sector with a specific focus on SMEs. Through cooperation with other European initiatives the network will provide a knowledge hub for HPC offering a comprehensive support infrastructure from basic training and initial uptake of HPC to specialist knowledge covering the entire HPC value chain including related topics such as intellectual property.

In the course of the action, the NCCs will have demonstrated their significant impact on the innovation capacity of the European HPC ecosystem supported by quantitative key performance indicators measuring the specific impact of individual NCCs with respect to the baseline established on the basis of common criteria for all NCCs.

A detailed competence map of the European HPC ecosystem will be available to identify expertise, monitor and assess the evolution HPC competences in the constituencies of the individual NCCs and in a European context.

The NCCs will address the following areas:

- Contribution to the realisation of the EuroHPC overall and specific objectives
- Promoting the use of HPC at national level by identifying relevant users and matching their needs with the available expertise in the HPC Competence Centres
- Effective establishment of a wide range of HPC services (as referred in the scope of the call)
- Support the development of leading-edge, innovative solutions by targeted regional/national stakeholders in the private and public sector
- Provision of support to interested end users that are/will use HPC and HPDA in their daily business.
- Contribute in ensuring European technological autonomy in this field

Objective: The aim is to support existing or the creation of up to one new NCC in EuroHPC JU Participating States that are currently not funded by the EuroHPC JU. The NCCs funded by the this call should extend the current network of NCCs of the EuroCC 2 initiative to additional countries. The NCCs will provide HPC services to industry (in particular to SMEs), academia and public administrations, delivering tailored/modular solutions for a wide variety of users, with an aim to ease and foster the transition towards wider uptake of HPC in Europe. NCCs will be a focal point of HPC in the respective country, liaising with national initiatives in the area of HPC, facilitating access of national stakeholders to European HPC competences and opportunities in different industrial sectors and domains. SMEs will be central to the NCC's activities. Academic institutions and stakeholders may be addressed only to a limited extent and most of the resources of an NCC will be dedicated to support local SMEs, industry and public services with the uptake of HPC

Scope: Set-up and/or operate NCC in a EuroHPC JU Participating States that do currently not have a NCC funded by the EuroHPC JU. The NCC will represent the focal point of national competences in HPC and provide leading-edge knowledge to enable the development of innovative solutions in their constituency, taking into account national HPC needs and requirements emanating from different user communities (industry, academia, public

administrations) and application domains. The NCC will establish and maintain a network of national HPC users, promote HPC use in the private and public sector, reach out to potential new users and develop the necessary expertise for HPC applications close to the relevant national and, in collaboration with other NCCs, European communities. Each NCC will act as an access point to the European network of NCCs and other European HPC initiatives such as the Centres of Excellence for HPC applications to ensure that local stakeholders have access to the best available support in Europe if the required expertise cannot be provided by the NCC or is out of scope of the NCC's activities. In return, NCCs will support stakeholders from other regions and countries that need their expertise coordinated through the NCC network and the complementary Coordination and Support Action CASTIEL 2. NCCs will implement a flexible and modular approach in the services to be provided, taking into account the degree of maturity of the national HPC ecosystem and in close coordination and collaboration with the other NCCs to achieve the highest possible impact and the widest possible spread of knowledge, ensure the most efficient use of NCC resources and to avoid duplication of effort among the NCCs and with other initiatives. Proposals should demonstrate the implementation of effective measures to close the gap between advanced and less developed NCCs.

HPC Competence Centres will, for example, engage in the following activities:

- Facilitate access to the HPC ecosystem including testbeds, hands-on sessions on HPC, HPC application optimising and scaling by connecting national communities with other initiatives such as the European Centres of Excellence for HPC applications.

- Facilitate uptake of HPC applications by different users, including SMEs (e.g. promoting locally relevant success stories), academia and public administrations.

- Provide scientific/technical expertise/consulting through application-oriented HPC knowledge/focus (e.g. HPC and High Performance Data Analytics (HPDA)), as well as access to advanced simulation and modelling algorithms, software codes and tools.

- Contribute with the expertise to the development activities (TRL 4-6) of SMEs and the public services to enable their efficient use of HPC resources (e.g., software porting and customization, deployment of advanced simulation and modelling algorithms, methods, and tools etc.).

- Provide on-site evaluations of new technologies, experimenting, proofs of concept as well as enable validation and demonstration of HPC technologies, software codes, tools, and algorithms in relevant environments.

- Facilitate access to supercomputing and data management for exploring innovation solutions of interest to end users, including SME user industries.

- Local and national training and skills development in the area of HPC and related subjects (e.g. HPDA, parallel programming, etc.), through face-to-face as well as online training (e.g. MOOC platforms).

- Awareness raising and outreach on the benefits of HPC to potential user industries, including SMEs.

- Raise awareness and support national and local communities in identifying and protecting intellectual property in an HPC context and provide advice on licensing policies in collaboration with the pan-European network of NCCs.

- Implement technology transfer activities at local/national level and the Digital Single Market.

It is required that the NCC – hosted by either one or several national organisations - is formally designated and mandated by the national authorities of the EU Member State or the EuroHPC JU Participating State. The NCC must be established as an organisation with appropriate visibility to the national communities and an independent organisational structure. The NCC must ensure that the NCC's activities are clearly identifiable and distinct from activities of the institution(s) hosting the NCC. In general, NCCs should employ HPC specialists, primarily full time, with expertise in areas most relevant for the national communities and NCC staff should not work under external supervision. The designated NCC leader should be directly involved in the management of the NCCs operations and is expected to report directly to the coordinator and the funding authority on all aspects of the centre's activities. Applicants are encouraged to implement a pan-European collaboration scheme together with EuroCC 2 for talent management including the identification and recruitment of HPC experts by the NCCs. Moreover, proposals should clearly set out an effective governance structure and decision making process within the consortium and the complementary Coordination and Support Action CASTIEL 2.

Individual NCCs will focus on activities where local support is most effective such as communication, consultation services, support specific to the relevant national and local communities and necessary co-development to fulfil the mission of NCC. Co-development activities with SMEs should be limited to SMEs and a maximum of 5% of the personnel resources of an NCC may be used for all direct development activities by the NCC. Moreover, development work of NCC staff must not overlap with activities pursued by other NCCs or initiatives and must be duly justified and formally endorsed by the coordinator of the NCC network and/or linked Coordination and Support Action. Actions of potentially broader scope will be coordinated with or transferred to the pan-European network of NCCs and complementary initiatives such as the European Centres of Excellence for HPC. Research activities as well as operation, administration or procurement of HPC systems are not within the scope the NCCs, but NCCs are expected to advise on such activities and support knowledge transfer e. g. from relevant European R&D initiatives to the local HPC ecosystem.

Proposals should clearly describe the mechanisms for exchange of information on the NCCs activities with the coordinator of the EUROCC 2 network and the CASTIEL 2 Coordination and Support Action to ensure the identification of synergies, take into account lessons learned in preceding similar activities, prevent redundant work and strengthen collaboration and cohesion. The NCCs will further support the coordinator of the pan-European NCC network and the relevant Coordination and Support Action in the development, implementation and reporting of common standards such as assessment criteria for NCCs, competence mapping, key performance indicators, measures on the impact of the NCCs on the European HPC ecosystem and a strategic roadmap for the further development of the NCC network.

The JU considers that proposals requesting a contribution from the JU of up to EUR 600,000 per national HPC Competence Centres[1] matched by the Participating States with a similar amount, and a duration of up to 21 months would allow this specific challenge to be addressed

appropriately. Nonetheless, this does not preclude submission and selection of proposals with another duration or requesting other amounts. In line with the NCCs of the EUROCC 2 network, each NCC may include up to five partners with estimated personnel resources of up to 10 full-time equivalents (FTEs) for the duration of the grant. The resource distribution in the proposed work plan should reflect the main focus of the NCC network, i. e. local support services for SMEs and industry, and be generally aligned with the common work package and organisational structure of the NCCs in the EUROCC 2 network. Applicants are expected to conclude a collaboration agreement, preferably before submission of the proposal, with the EUROCC 2 and CASTIEL 2 consortia which will allow participation under the same terms and conditions as NCCs of the EUROCC 2 consortium.

INTERNATIONAL COOPERATION PILLAR

The EuroHPC JU Regulation gives a mandate to the EuroHPC JU to implement cooperation and collaboration with third countries advancing the work on HPC applications in domains of common interest, including facilitating access for researchers to EuroHPC JU resources and co-development of HPC applications. EuroHPC JU will align its activities with the European Commission strategy on EU Digital Partnerships in order advance cooperation on digital issues with like-minded third countries.

Ongoing Activities

- In 2022 EuroHPC JU launched the call on collaboration on HPC with Japan
- In 2023, EuroHPC JU launched a call for collaboration on HPC with India
- EuroHPC JU will implement the HPC elements of EU-Japan Digital Partnership
- EuroHPC JU will allocate EUR 10 Million from Horizon Europe to follow-up activities linked to the EU's Digital Partnership Strategy or similar actions

Call 2024:

Scientific collaboration on HPC and Quantum Computing with third countries

Expected Outcome:

In 2024, EuroHPC JU will launch a call with on international cooperation in HPC and quantum computing to implement the Union's Digital Partnerships.

Indicative Budget:

An EU contribution from the Horizon Europe Programme of EUR 10 Million for a duration of 3 years (100% EU funded)

ADMINISTRATION

Communication and stakeholder engagement

In 2024, the EuroHPC will further develop and consolidate its public image.

- **Online Dissemination of EuroHPC JU Activities and Opportunities**

In 2024, the JU will upgrade its online presence thanks to an improved website, becoming the single gateway to find information on EuroHPC JU activities, calls, opportunities and request access EuroHPC supercomputers. It will also add features to support EuroHPC public and private members to provide funding information.

- **Organisation of workshops to support and promote operational EuroHPC JU activities**

The JU will organise a number of workshops in order to engage with stakeholders in the HPC and Quantum communities in order to promote operational activities.

The JU will host a regular monthly online meetings of the EuroHPC Hosting Entities. Up to two in person meetings may take place and be hosted, with support from the JU, in a Hosting Entity.

In addition, the JU will fund up to two in person RIAG and INFRAG meetings in 2024 in Luxembourg, Brussels and/or during the annual EuroHPC Summit.

- **EuroHPC Summit 2024**

The EuroHPC Summit 2024 will take place in Belgium on 18-21 March 2024, during the Belgian EU Presidency. The organisation of this event will be based on the best practice and experience of the past **EuroHPC Summit 2023.** An estimated budget of EUR 700,000 is allocated from DEP operational activities.

The event will gather key European HPC stakeholders from providers to scientific and industrial users, to policy makers. As in 2023, particular attention will be given to the students of the EUMaster4HPC and to the R&I projects of the JU.

The Summit will be an important moment to showcase the latest achievements and opportunities in the European supercomputing ecosystem, but also to discuss and reflect on the current and future challenges in HPC, quantum, and Artificial Intelligence computing. The event will provide also a great opportunity for attendees to network and connect with the European HPC and quantum community

- **EuroHPC Summit 2025**

The EuroHPC Summit 2025 will take place in Poland, during the Polish EU Presidency. An estimated budget of EUR 700,000 will be allocated from DEP operational activities.

- **Other Conferences in 2024**
    - **ISC High Performance 2024**

The EuroHPC JU will participate again in the event ISC 2024 as exhibitor. It will also support the ISC organisers to promote TOP 500 communication activities. In 2024, the event will take place from May 12 to May 16 2024 in Hamburg, Germany. ISC is the largest forum in Europe for high performance computing, high performance data analytics and AI/machine learning

and brings together vendors, public institutions, and startups. It is also one of the two moments in the year where the TOP 500 and Top Green 500 ranking lists to benchmark HPC systems are communicated to the HPC community.

Following a successful cooperation with around 30 EuroHPC R&I projects and 2 EuroHPC hosting entities to develop and showcase a joint EuroHPC stand of 40 sqm at ISC 2023, the JU aims to reiterate the invitation to its partners to develop a coordinated EuroHPC village showcasing European achievements.

The event is a great opportunity for the EuroHPC JU to showcase its opportunities, its supercomputers and R&I projects. ISC 2024 is also critical for the JU to consolidate its public image while increasing its network and its European users base. An estimated budget of EUR 150,000 will be allocated from DEP operational activities.

- **Supercomputing Conference (SC24)**

The JU aims to promote its activities and achievements at SC24, the largest annual international HPC fora. SC24 will take place in the United States in November 2024. An estimated budget of EUR 150,000 will be allocated from DEP operational activities.

- **User Day 2024**

Following the successful User Day event organised in 2023, User Day 2024 will be organised in order to disseminate results of projects that have had access to EuroHPC JU systems. An estimated budget of EUR 150,000 will be allocated from DEP operational activities.

Other Communication activities

In addition, the EuroHPC JU will also ensure the following activities:

- Regular in-person meetings between key EuroHPC stakeholders (GB, RIAG, INFRAG, EuroHPC Users, the Hosting Entities, R&I partners) to ensure efficient and coordinated collaboration develop synergies and reach potential new EuroHPC users
- Inauguration of new EuroHPC supercomputers such as JUPITER in Germany
- Interactive publications of JU reports such as the Annual Activity Report, the Systems Report, to improve the attractiveness of the documents.

Legal

The JU is dependent on excellent legal support in order to do its work. It will procure, where necessary, external legal counsel to support it in implementing its operational activities.

Internal Control

The JU's Internal control system was fully set up and implemented in 2023. In 2024, it will be further strengthened to ensure that all internal control activities are implemented across the JU. The JU will finalise its EuroHPC Control strategy for beneficiaries of EU funded projects and oversee that adequate controls are carried out. The JU will also revise its ex-ante and ex-post controls and obtain a balanced and integrated control approach.

IT and Office activities

EuroHPC JU will benefit from the shared IT services, provided on the basis of the Framework Contract signed between the Joint Undertakings and the contractor – Real Dolmen.

The JU will also cooperate with the network of JUs in sharing expertise between IT JU professionals in the context of the back-office arrangement, mainly in the following areas:

- Inter-JU IT governance,
- Management of ICT tools, services and contracts EC applications, tools and services, EC FWCs Other tools and services (TBC),
- Security and compliance management.

Finance, audit and budgetary discharge

The 2024 administrative budget structure of the JU was updated with the initial Decision of the 2024 Annual Work Programme to better accommodate the various budget chapters and articles (also known as budget lines) to a more mature, agile and structured administration. The changes approved by the GB in the initial Annual Work Programme 2024 did not alter the budgetary envelope and perimeter of neither Title I nor Title II.

Chapter 11 (Salaries and allowances of staff) is as from 2024 subdivided into 3 articles for better clarity and reporting (Temporary agents, Contract agents, and thirdly SNEs, interims and trainees). A chapter 15 was also created, to gather under one line all HR administrative services (SLAs, BOAs, external HR legal advice).

In Title 2, the Postage and Telecommunications chapter was merged with chapter 23 (Current administrative expenditure), considering the small volume of that former Postage and Telecommunications line. Chapter 25 was renamed to Internal Meetings, in order to clarify and separate internal corporate meetings, such as the GB, from other operational related events booked under Chapter 27 (Communication, Information and Events). Chapter 26 was also renamed (Legal Services), as it is the case with Chapter 28 (Experts and associated costs). Finally, a new Chapter 24 was created to concentrate in one single line all auditing and external consultancy costs linked strictlto administrative matters (External administrative consultancy and auditing). All in all, the budget chapters better reflect the internal organisation structure, with clear internal budget owners per chapter and better monitoring and planning of the expenditure.

The expenditure tables 3 and 4, which can be found in the below section, already incorporate the updated budget structure of 2024, even if it applies also to the past 2023 and 2022 financial years.

In addition, the JU successfully presented a positive performance and compliance of its 2022 financial year at the Budgetary Control Committee of the European Parliament. As a result, and judging by the draft available report from the European Parliament, it is expected that the Executive Director will be granted discharge during 2024 of the 2022 financial year.

During 2024, ex-post financial audits of grant beneficiaries will continue to be organised, along the guidelines of the various programmes the JU is operating.

BUDGET 2024

1. Revenue

In accordance with the provisions of the legal framework applicable to the EuroHPC JU, the contributors to the budget of the JU are defined in article 5, 6, 7 and 8 of Council Regulation (EU) 2021/1173.

The 2024 budget presented below includes revenues allocated under Horizon 2020 and the Multi Annual Programmes 2021-2027 which are Digital Europe Programme, Horizon Europe and Connected Europe Facility.

The revenue budget is, in total, EUR 299,794,506, and it includes EUR 80,960,688 re-activated in 2024 budget amendment no. 1.

Table 1 Revenue Commitment Appropriations

REVENUE (EUR)	Executed Budget 2022 (C1+ C2 credits)	Executed Budget 2023 (C1+ C2 credits)	2024		2024 AMD NO.2		
			Total Amended Budget (C1 + C2 Credits)	Internal transfer by ED	C1 Credits	C2 Credits	Total Amended Budget (C1 + C2 Credits)
1. Fees and Charges							
2. EU Contribution with EFTA included	709,766,750	623,398,655	269,794,506	-	-	-	269,794,506
of which Regulation (EU) 2021/1173 Administrative (Title 1 and Title 2)	1,477,022	3,447,160	7,804,155				7,804,155
of which old Regulation (EU) 2018/1488 Administrative (Title 1 and Title 2)	2,218,610	2,279,982	1,280,000				1,280,000
of which Regulation (EU) 2021/1173 Operations (Title 3)	623,366,120	617,652,201	260,696,663				260,696,663
of which old Regulation (EU) 2018/1488 Operations (Title 3)	82,704,999	19,312	13,688				13,688
3. Third Country Contribution		-	-	-	-	-	-
4. Other Contributions	377,705,000	270,850,000	30,000,000	-	-	-	30,000,000
Participating States							-
Contribution to the procurement MN5, Leonardo & Lumi	*75,705,000*	-					-
PT contribution to procurement of petascale	-	-					-
Contribution to the call of the high-end (exascale) supercomputers	250,000,000	270,850,000					-
Contribution to the call of the quantum computers	52,000,000		30,000,000				30,000,000
Private Members		-					-
Total REVENUE (EU + 3rd Countries + Participating States Contributions	1,087,471,750	894,248,655	299,794,506	-	-	-	299,794,506

Table 2 Revenue Payment Appropriations

REVENUE (EUR)	Executed Budget 2022 (C1+ C2 credits)	Executed Budget 2023 (C1+ C2 credits)	2024		2024 AMD NO.2		
			Total Amended Budget (C1 + C2 Credits)	Internal transfer by ED	C1 Credits	C2 Credits	Total Amended Budget (C1 + C2 Credits)
1. Fees and Charges							
2. EU Contribution with EFTA included	101,179,401	157,864,966	566,672,387	-	-	-	566,672,387
of which Regulation (EU) 2021/1173 Administrative (Title 1 and Title 2)	2,528,650	3,447,160	7,804,155				7,804,155
of which old Regulation (EU) 2018/1488 Administrative (Title 1 and Title 2)	2,218,610	1,965,743	2,035,108				2,035,108
of which Regulation (EU) 2021/1173 Operations (Title 3)	36,479,076	60,262,383	456,344,323				456,344,323
of which old Regulation (EU) 2018/1488 Operations (Title 3)	59,953,066	92,189,681	100,488,802				100,488,802
3. Third Country Contribution		-	-	-	-	-	-
4. Other Contributions	54,694,803	48,407,346	152,140,158	-	-	-	152,140,158
Participating States							-
Contribution to the procurement MN5, Leonardo & Lumi	49,803,454	9,529,627	79,176,821				79,176,821
PT contribution to procurement of petascale	4,891,349	2,240,734	1,791,701				1,791,701
Contribution to the call of the high-end (exascale) supercomputers		36,636,985	37,130,136				37,130,136
Contribution to the call of the quantum computers	-		34,041,500				34,041,500
Private Members	-						-
Total REVENUE (EU + 3rd Country + Participating States Contributions	155,874,204	206,272,312	718,812,546	-	-	-	718,812,546

Budget Expenditure

Titles 1 and 2: In the 2024 opening budget decision, the Governing Board approved an administrative allocation (titles 1 and 2) of EUR 7.8 Million (C1 budget credits). In the amendment no. 1 of the 2024 budget, the JU has re-activated credits from past years (C2 credits) for an amount of EUR 1.2 Million, in terms of commitment appropriations, and of EUR 2 Million, in terms of payment appropriations.

The overall administrative budget remains aligned with the maximum foreseen amount under the JU Regulation of EUR 92 Million, under the current 2021-2027 Multi-Annual Financial Framework.

Title 3: The operational expenditure will be used for grants and procurements of the EuroHPC JU supercomputers, reflecting the priorities of the amended Annual Work Programme 2024. More details regarding commitment and payment appropriations are shown in tables 3, 4, 5a, 5b, 5c and 5d. With the amendment no. 1 of the 2024 Annual Work Programme and Budget, the JU has re-activated commitment credits from past years (C2) for an amount of EUR 79.7 Million, and payment credits from past years (C2) of EUR 428.1 Million.

Table 3 Expenditure Commitment Appropriations (in EUR)

EXPENDITURES (EUR)	Final Budget 2022 (C1+ C2 credits)	Executed Budget 2023 (C1+ C2 credits)	2024		2024 AMD NO.2		
			Total Amended Budget (C1 + C2 credits)	Internal transfer by ED	C1 Credits	C2 Credits	Total Amended Budget (C1 + C2 credits)
Title 1. Staff Expenditure	**2,483,871**	**4,278,053**	**6,465,868**	-	-	-	**6,465,868**
11 Salaries & Allowances	**2,081,956**	**3,728,086**	**5,366,868**	-	-	-	**5,366,868**
1100 - Temparary Agents	887,096	2,305,544	3,256,928				3,256,928
1110 - Contractual Agents	1,194,860	1,422,541	1,809,940				1,809,940
1120 - Interim, Trainees & SNEs			300,000				300,000
12 Expenditure relating to recruitment	**1,501**	**25,718**	**32,000**				**32,000**
13 Missions and travel expenses	**90,752**	**201,695**	**270,000**				**270,000**
14 Socio-medical and training	**309,662**	**322,554**	**297,000**	-	-	-	**297,000**
1400 - CAS & EU School transports			82,837				82,837
1410 - Trainings			139,464				139,464
1420 - Social measures for Staff			74,700				74,700
1500 - HR administrative services			**500,000**				**500,000**
Title 2. Building, Equipment and Operating Costs	**1,211,761**	**1,449,089**	**2,598,287**	-	-	-	**2,598,287**
20 Buildings and associated costs	**21,111**	**93,901**	**80,000**				**80,000**
21 Information Technology	**228,991**	**333,344**	**500,000**				**500,000**
22 Movable property	-	**2,549**	**37,000**				**37,000**
23 Current administrative expenditure	**166,230**	**120,051**	**325,000**				**325,000**
24 External consultancy & auditing	**5,313**	**5,201**	**270,000**				**270,000**
25 Internal Meetings	**34,779**	**71,122**	**100,000**				**100,000**
26 Legal services	**248,338**	**306,986**	**150,000**				**150,000**
27 Comm, Information & Events	-	**90,250**	**365,000**				**365,000**
28 Experts and associated costs	**507,000**	**425,684**	**771,287**				**771,287**
Total ADMIN (Tilte I and II)	**3,695,631**	**5,727,142**	**9,064,155**	-	-	-	**9,064,155**

EXPENDITURES (EUR)	Final Budget 2022 (C1+ C2 credits)	Executed Budget 2023 (C1+ C2 credits)	2024		2024 AMD NO.2		
			Total Amended Budget (C1 + C2 credits)	Internal transfer by ED	C1 Credits	C2 Credits	Total Amended Budget (C1 + C2 credits)
Total ADMIN (Tilte I and II)	**3,695,631**	**5,727,142**	**9,064,155**	-	-	-	**9,064,155**
Title 3. Operational Expenditure							
30 Grants, HPC Operations, R&I Activities	**80,866,561**	**225,019,312**	**202,578,637**	-	-	-	**202,578,637**
Regulation (EU) 2018/1488 Calls	**6,999,999**	**19,312**	**33,688**	-	-	-	**33,688**
EuroHPC-2019-1	-	19,312	33,688				33,688
EuroHPC-2020 -3	6,999,999	-	-			-	-
Regulation (EU) 2021/1173 Calls	**73,866,562**	**225,000,000**	**202,544,949**	-	-	-	**202,544,949**
c. Federation Pillar			-				-
d. Technologies Pillar		**185,000,000**	**88,677,949**				**88,677,949**
e. Applications Pillar	**39,907,650**	**30,000,000**	**88,867,000**				**88,867,000**
f. Compentences & Skills Pillar	**33,958,912**		**15,000,000**				**15,000,000**
g. International Cooperation Pillar		**10,000,000**	**10,000,000**				**10,000,000**
31 HPC Infrastructure Activities	**1,002,909,558**	**663,502,201**	**88,151,714**	-	-	-	**88,151,714**
Regulation (EU) 2018/1488	**151,400,000**	-	-		-	-	-
LUMI - PreExscale	-	-					-
LEONARDO - PreExscale	-	-					-
MN5 - PreExscale	151,400,000	-					-
Deucalion - Petascale	-	-					-
Regulation (EU) 2021/1173	**851,509,558**	**663,502,201**	**88,151,714**	-	-	-	**88,151,714**
High-end (Exascale) supercomputer (2nd	500,000,000	541,700,000	-				-
Mid-range supercompter(s)	114,000,000	64,597,000	-				-
Hyperconnectivity for HPC Resources call & Federation Call	100,000,000	-	-				-
Upgrading EuroHPC supercomputers	33,000,000	-	-				-
Quantum computers (1/2/3 calls)	104,000,000	20,000,000	40,000,000				40,000,000
Access and allocation of EuroHPC computing resources and services	-	120,000	1,800,000				1,800,000
Industrial HPC (1+2)		12,260,601	45,651,714				45,651,714
EuroHPC Summit + Communications	509,558	719,304	700,000				700,000
Experimental Platform for European Technology		24,044,496	-				-
User Forum		60,800	-				-
Total OPERATIONAL (Title III)	**1,083,776,119**	**888,521,513**	**290,730,351**	-	-	-	**290,730,351**
TOTAL	**1,087,471,750**	**894,248,655**	**299,794,506**	-	-	-	**299,794,506**

Table 4 Expenditure Payment Appropriations (in EUR)

EXPENDITURES (EUR)	Final Budget 2022 (C1+ C2 credits)	Executed Budget 2023 (C1+ C2 credits)	2024		2024 AMD NO.2		
			Total Amended Budget (C1 + C2 credits)	Internal transfer by ED	C1 Credits	C2 Credits	Total Amended Budget (C1 + C2 credits)
Title 1. Staff Expenditure	**4,051,713**	**4,055,875**	**6,715,656**	-	-	-	**6,715,656**
11 Salaries & Allowances	**3,863,897**	**3,664,102**	**5,398,003**	-	-	-	**5,398,003**
1100 - Temparary Agents	121,423	2,305,544	3,256,928				3,256,928
1110 - Contractual Agents	618,475	1,358,558	1,841,075				1,841,075
1120 - Interim, Trainees & SNEs			300,000				300,000
12 Expenditure relating to recruitment	**1,335**	**16,646**	**32,000**				**32,000**
13 Missions and travel expenses	**45,693**	**180,581**	**321,159**				**321,159**
14 Socio-medical and training	**140,788**	**194,546**	**297,000**	-	-	-	**297,000**
1400 - CAS & EU School transports			82,837				82,837
1410 - Trainings			139,464				139,464
1420 - Social measures for Staff			74,700				74,700
15 - HR administrative services			**667,494**				**667,494**
Title 2. Building, Equipment and Operating Costs	**695,546**	**1,357,028**	**3,103,606**	-	-	-	**3,103,606**
20 Buildings and associated costs	**18,011**	**83,851**	**91,055**				**91,055**
21 Information Technology	**192,932**	**380,922**	**522,901**				**522,901**
22 Movable property	-	**2,549**	**37,000**				**37,000**
23 Current administrative expenditure	**108,480**	**109,675**	**357,158**				**357,158**
24 External consultancy & auditing	**1,274**	**5,919**	**277,676**				**277,676**
25 Internal Meetings	**25,699**	**53,988**	**120,454**				**120,454**
26 Legal services	**198,819**	**192,004**	**344,335**				**344,335**
27 Comm, Information & Events	-	**35,000**	**365,000**				**365,000**
28 Experts and associated costs	**150,331**	**493,119**	**988,027**				**988,027**
Total ADMIN (Tilte I and II)	**4,747,259**	**5,412,903**	**9,819,263**	-	-	-	**9,819,263**

EXPENDITURES (EUR)	Final Budget 2022 (C1+ C2 credits)	Executed Budget 2023 (C1+ C2 credits)	2024		2024 AMD NO.2		
			Total Amended Budget (C1 + C2 credits)	Internal transfer by ED	C1 Credits	C2 Credits	Total Amended Budget (C1 + C2 credits)
Total ADMIN (Tilte I and II)	**4,747,259**	**5,412,903**	**9,819,263**	-	-	-	**9,819,263**
Title 3. Operational Expenditure							
30 Grants, HPC Operations, R&I Activities	**49,017,749**	**29,706,292**	**353,893,358**	-	-	-	**353,893,358**
Regulation (EU) 2018/1488 Calls	**12,538,673**	**19,908,134**	**55,576,023**	-	-	-	**55,576,023**
EuroHPC-2019-1	390,500	5,015,453	5,848,021				5,848,021
EuroHPC-2019-2	3,993,504		3,993,504				3,993,504
EuroHPC-2019-3	515,000		515,000				515,000
EuroHPC-2020 -1		3,129,855	9,239,771				9,239,771
EuroHPC-2020 -2	3,906,336	4,164,937	9,033,956				9,033,956
EuroHPC-2020 -3	3,733,333		10,419,282				10,419,282
Opex Grants (LUMI, LEONARDO, MN5)		7,597,889	16,526,489				16,526,489
Regulation (EU) 2021/1173 Calls	**36,479,076**	**9,798,157**	**298,317,335**		-	-	**298,317,335**
c. Federation Pillar			4,000,000				4,000,000
d. Technology Pillar			171,028,014				171,028,014
e. Applications Pillar	18,501,054	8,798,273	58,500,673				58,500,673
f. Compentences & Skills Pillar	17,978,022	999,884	48,788,648				48,788,648
g. International Cooperation Pillar	-		16,000,000				16,000,000
31 HPC Infrastructure Activities	**102,109,196**	**171,153,117**	**355,099,924**	-	-	-	**355,099,924**
Regulation (EU) 2018/1488	**102,109,196**	**84,051,907**	**125,901,301**	-	-	-	**125,901,301**
LUMI - PreExscale		68,510,638	4,433,829				4,433,829
LEONARDO - PreExscale	49,803,454	11,502,797	17,487,903				17,487,903
MNS5 - PreExscale Supercomputer	47,414,393	1,797,739	102,187,868				102,187,868
Deucalion & Meluxina - Petascale	4,891,349	2,240,734	1,791,701				1,791,701
Regulation (EU) 2021/1173	-	**87,101,210**	**229,198,624**	-	-	-	**229,198,624**
High-end (exascale) supercomputer		86,636,985	133,219,302				133,219,302
Mid-range supercompter(s)			-				-
Hyperconnectivity for HPC Resources call & Federation Call			10,775,084				10,775,084
Upgrading EuroHPC supercomputers			4,153,875				4,153,875
Quantum computers			55,641,500				55,641,500
Access and allocation of EuroHPC computing resources and services			1,000,000				1,000,000
Industrial HPC (1+2)			16,495,514				16,495,514
EuroHPC Summit + Communications		464,225	700,000				700,000
Experimental Platform for European Technology			7,213,349				7,213,349
User Forum			-				-
Total OPERATIONAL (Title III)	**151,126,945**	**200,859,409**	**708,993,282**	-	-	-	**708,993,282**
TOTAL	**155,874,204**	**206,272,312**	**718,812,545**	-	-	-	**718,812,545**

Tables 5a and 5b Cash Flow Operational Budget – Title III – EuroHPC grants (Chapter 30)

In the following two tables 5a and 5b a cashflow overview is presented, divided by the actions under the 2021 Regulation, and the on-going actions under the past Horizon 2020 programme.

Table 5a – Cashflow overview Chapter 30 under 2021 Regulation (in EUR)

FY2024	Type of payment *	Funding Programme	C1 Credits (EUR)	C2 Credits (EUR)	Total C1+C2 Credits
c. Federation Pillar			-	4,000,000	4,000,000
Epicure		DEP		4,000,000	4,000,000
d. Technology Pillar			38,000,564	133,027,450	171,028,014
HORIZON-EUROHPC-JU-2022-TECH-03				93,027,450	93,027,450
HORIZON-EUROHPC-JU-2023-ENERGY-04				16,000,000	16,000,000
HORIZON-EUROHPC-JU-2023-INTER-02				24,000,000	24,000,000
d) HPC/QC Middleware technologies			10,000,000	-	10,000,000
d) Integration of technologies from European Processing Initiative in HPC systems (EPI3)		HE	18,000,564	-	18,000,564
d) Development of new benchmarks for HPC, Quantum Computing, and AI			5,000,000	-	5,000,000
d) Enabling Universal Access and Integration of Quantum Resourses			5,000,000	-	5,000,000
e. Applications Pillar			19,500,000	39,000,673	58,500,673
DIGITAL-EUROHPC-JU-2023-AISC-03				3,900,000	3,900,000
e) Applications Excellence				16,000,000	16,000,000
HORIZON-EUROHPC-JU-2023-QEC-05				8,000,000	8,000,000
e) Continuous integration and deployment platform (CI/CD)		DEP/HE	1,500,000	-	1,500,000
e) HPC for AI Software Ecosystem			4,000,000	-	4,000,000
e) HPC Applications			10,000,000	-	10,000,000
e) HPC/Cybersecurity/AI			4,000,000	-	4,000,000
HORIZON-EUROHPC-JU-2023-COE-03				11,100,673	11,100,673
f. Compentences & Skills Pillar			8,000,000	40,788,648	48,788,648
EuroCC 2				11,021,978	11,021,978
Castiel 2				2,400,000	2,400,000
f) Digital Opportunity Traineeships project				4,000,116	4,000,116
HPC SPECTRA				1,000,000	1,000,000
HPCTRAIN	PP/IP	DEP		2,000,000	2,000,000
DIGITAL-EUROHPC-JU-2023-SME-01				17,966,554	17,966,554
DIGITAL-EUROHPC-JU-2023-ACADEMY				2,400,000	2,400,000
f) EuroHPC Masters Programme			8,000,000	-	8,000,000
g.International Cooperation Pillar			8,000,000	8,000,000	16,000,000
HANAMI				4,000,000	4,000,000
HORIZON-EUROHPC-JU-2023-INCO 06-01	PP/IP	HE		4,000,000	4,000,000
Support EU Digital Partnership activities			8,000,000		8,000,000
Regulation (EU) 2021/1173 Total PA FY2024			73,500,564	224,816,771	298,317,335

** FP - Final Payments, IP - Interim Payments, PP - Pre-financing*

Table 5b – Cashflow overview Chapter 30 (Grants) of Horizon2020 on-going actions (in EUR)

FY 2024	Type of payment*	C1 Credits (EUR)	C2 Credits (EUR)	Total C1+C2 Credits
EFLOWS4HPC -H2020-JTI-EuroHPC-2019-1	IP/FP	357,666		**357,666**
SCALABLE H2020-JTI-EuroHPC-2019-1			141,533	**141,533**
LIGATE H2020-JTI-EuroHPC-2019-1			261,206	**261,206**
ACROSS H2020-JTI-EuroHPC-2019-1		399,912		**399,912**
OPTIMA H2020-JTI-EuroHPC-2019-1			174,248	**174,248**
NextSim H2020-JTI-EuroHPC-2019-1		188,470		**188,470**
DComEX H2020-JTI-EuroHPC-2019-1		135,938		**135,938**
RED-SEA H2020-JTI-EuroHPC-2019-1		399,686		**399,686**
IO-SEA H2020-JTI-EuroHPC-2019-1		399,798		**399,798**
MICROCARD H2020-JTI-EuroHPC-2019-1		277,705		**277,705**
SPARCITY H2020-JTI-EuroHPC-2019-1		130,274		**130,274**
DEEP-SEA H2020-JTI-EuroHPC-2019-1		753,474		**753,474**
REGALE H2020-JTI-EuroHPC-2019-1		330,929		**330,929**
eProcessor H2020-JTI-EuroHPC-2019-1		399,999		**399,999**
ADMIRE H2020-JTI-EuroHPC-2019-1		398,164		**398,164**
MAELSTROM H2020-JTI-EuroHPC-2019-1		215,621		**215,621**
TIME-X H2020-JTI-EuroHPC-2019-1		151,213		**151,213**
EXAFOAM H2020-JTI-EuroHPC-2019-1		240,180	240,180	**480,361**
TEXTAROSSA H2020-JTI-EuroHPC-2019-1		205,138		**205,138**
EuroHPC-2019-1		**4,984,165**	**817,168**	**5,801,332**
Late interest payments PA available		20,000	26,688	**46,688**
Total late interest		**20,000**	**26,688**	**46,688**
951745 - FF4EUROHPC - H2020-JTI-EUROHPC-2019-2	IP/FP		999,848	**999,848**
951740 - CASTIEL - H2020-JTI-EUROHPC-2019-2 -			199,988	**199,988**
951732 - EUROCC - H2020-JTI-EUROHPC-2019-2			2,793,668	**2,793,668**
EuroHPC-2019-2		**0**	**3,993,504**	**3,993,504**
946002 - MEEP - H2020-JTI-EUROHPC-2019-3	IP/FP		515,000	**515,000**
EuroHPC-2019-3		**0**	**515,000**	**515,000**
LUMI - OPEX	IP/FP	4,967,793	2,412,111	**7,379,904**
LEONARDO - OPEX		5,396,955		**5,396,955**
MN5 - OPEX			3,749,631	**3,749,631**
Opex Grants		**10,364,748**	**6,161,741**	**16,526,489**
Eupex_EuroHPC-2020-01a	IP/FP	3,057,005	1,759,928	**4,816,933**
The European Pilot_EuroHPC-2020-01a		2,333,328	222,844	**2,556,171**
HPCQS_EuroHPC-2020-01b		266,667	1,600,000	**1,866,667**
H2020-JTI-EuroHPC-2020-01		**5,656,999**	**3,582,772**	**9,239,771**
EPI EuroHPC-2020-02	IP/FP	8,552,615	9,033,956	**17,586,571**
H2020-JTI-EuroHPC-2020-02		**8,552,615**	**9,033,956**	**17,586,571**
EU Masters4HPC_EuroHPC-2020-03	IP/FP		1,866,667	**1,866,667**
H2020-JTI-EuroHPC-2020-03		**0**	**1,866,667**	**1,866,667**
Regulation (EU) 2018/1488 Total PA (Horizon2020 funds)		**29,578,527**	**25,997,496**	**55,576,023**

** FP - Final Payments, IP - Interim Payments, PP - Pre-financing*

Tables 5c and 5d Cash Flow Operational Budget – Title III – EuroHPC Infrastructure activities (Chapter 31)

In the following two tables 5c and 5d, a cashflow overview is presented, divided by the actions under the 2021 Regulation, and the on-going actions under the past 2018 Regulation, now superseded by the 2021 Regulation.

Table 5c – Cashflow overview Chapter 31 under 2021 Regulation

FY 2024	Type of payment *	Funding	Type of Procurement **	C1 Credits (EUR)		C2 Credits (EUR)	
				EU	PS***	EU	PS
b) Infrastructure Pillar				76,154,543	32,000,000	63,884,011	39,171,636
High-end / Exascale supercomputers	PP/IP	DEP	EHPC				
Jupiter Project						37,130,136	37,130,136
Jules Verne Project				58,959,029			
Upgrading EuroHPC supercomputers	PP/IP	DEP	Joint				
Discoverer+ Project					n/a	364,875	n/a
Lisa Project						3,789,000	
Quantum computers	PP/IP	DEP	EHPC				
EuroQCS-France Project						3,600,000	
EuroQCS-Italy Project						3,600,000	
EuroQCS-Spain Project						3,600,000	
EuroQCS-Poland Project						3,600,000	
Lumi-Q Project						3,600,000	2,041,500
Euro-Q-Exa Project					32,000,000	3,600,000	
Acces IT Platform Project	PP/IP	DEP	EHPC		n/a	1,000,000	n/a
EuroHPC Summit 2024/2025	PP/IP	DEP	EHPC	700,000	n/a		n/a
Industrial HPC	PP/IP	DEP	Joint				
Industrial HPC 1st Call				3,400,000	n/a		n/a
Industrial HPC 2nd Call				13,095,514	n/a		n/a
c. Federation Pillar						10,775,084	
Hyperconnectivity for HPC Resources call (with INFRAG and GEANT)							
EuroHPC/LUX/2022/OP/01	PP/IP	CEF2	EHPC		n/a	775,084	n/a
c7) Federation of supercomputing and data resources call					n/a	10,000,000	n/a
EUROHPC/2023/CD/0003					n/a		n/a
d. Technology Pillar						7,213,349	
d6)Experimental Platform for European Technology	PP/IP	HE	EHPC		n/a	7,213,349	n/a
Regulation (EU) 2021/1173 Total PA FY2024				76,154,543	32,000,000	81,872,444	39,171,636

FP - Final Payments, IP - Interim Payments, PP - Pre-financing

*** Joint Procurement : Participation States contributions is managed by NFA, not entered in EuroHPC budget*

**** Participating States contributions entered in EuroHPC Budget*

Table 5d – Cashflow overview Chapter 31 for actions initiated before the 2021 Regulation

FY 2024	Type of payment*	C1 Credits (EUR)		C2 Credits (EUR)	
		EU	PS	EU	PS
LUMI - PreExscale	IP/FP	1,878,888	2,183,617		371,324
LEONARDO - PreExscale	IP/FP	921,880	921,880	15,644,143	
MN5 - PreExscale	IP/FP		63,779,976	26,487,868	11,920,024
Deucalion - Petascale	IP/FP				1,791,701
Regulation (EU) 2018/1488 Total PA		2,800,768	66,885,473	42,132,011	14,083,049

** FP - Final Payments, IP - Interim Payments, PP - Pre-financing*

Table 6: Reactivated Budget in budget amendment no. 1 of 2024 (Administrative) - Titles 1 and 2 (in EUR)

Budget to be Reactivated in 2023 (Administrative) (of which)	Commitment Appropriations (CA)	Payment Appropriations (PA)
Reactivation of Available Credits from the year 2023	1,280,000	2,035,108
n-1 - Credits (C1 from FY2023)		
n-2 - Credits (C1 from FY2022)	1,148,681	2,035,108
n-3 - Credits (C1 from FY2021)	131,319	

Table 7: Reactivated Budget in budget amendment no. 1 of 2024 (Operational) - Title 3 (in EUR)

Budget to be Reactivated in 2024 (Operational) (of which)	Commitment Appropriations (CA)	Payment Appropriations (PA)
Reactivation of Available Credits from the year 2023	79,680,688	431,673,408
n-1 - Credits (C1 from FY2023)		130,337,524
n-2 - Credits (C1 from FY2022)	26,813,688	301,335,884
n-3 - Credits (C1 from FY2021)	52,867,000	-

2. Information of the use of EuroHPC JU financial resources

a) Title 1: Staff Expenditure

Chapter 11 – Salaries and Allowances

This chapter covers the expenditure for salaries, social security, pension contributions and other related allowances of staff. It covers the remuneration cost of establishment plan posts (temporary staff) and external personnel (contract staff, Seconded National Experts, interim agents and trainees), in accordance with the Staff Regulations.

Chapter 12 – Expenditure relating to recruitment

This chapter covers the expenditure regarding the recruitment process of new staff and the associated administrative costs.

Chapter 13 – Mission and travel expenses

This chapter covers travel agency fees and the reimbursements of costs of staff having to go on mission / travel for business. It covers travel expenses, daily subsistence allowances and ancillary or exceptional expenditure incurred by staff, whilst on mission, in the interest of the service. As part of its duties the JU staff will have to travel to various conferences, meetings and workshops related to the activities of the Joint Undertaking and to the actions funded.

Chapter 14 – Socio-medical expenditure and professional development

This chapter covers the JU contribution to the costs of the Comité des Activités Sociales, (e.g. the "crèche", the "garderie/centre d'études", the school bus), the medical service, the policy linked to financial assistance to disabled persons, the complementary health insurance, contribution of the home office (as per European Commission guidelines), and other related activities. It also covers the cost for professional development and training programme

Chapter 15 – HR administrative services

This chapter covers costs of all SLAs and working arrangements with other EU bodies for HR matters, together with specialised external HR legal costs, when required.

b) Title 2: Building, Equipment and Operating Costs

Chapter 20 – Building and associated costs

This Chapter covers costs related to the infrastructure including e.g. office overheads and insurance, cleaning and maintenance, security and surveillance (where not covered by the SLA with DG HR) and others. The office premises are provided by the JU hosting country.

Chapter 21 – Information Technology

This Chapter covers costs related to the purchase of computer equipment, video conference equipment, the cost of software and also software package maintenance, user support, and others. It includes the procurement and maintenance of programme packages and software licenses necessary for the effective operation of the JU, the expenditure on services contracts for analysis, programming and technical assistance necessary for the JU, the cost of external services contracts to manage and maintain the data and systems, training and other support activities.

Chapter 22 – Movable property and associated costs

This Chapter covers the necessary resources to cover the costs of the organisation of the office e.g. office furniture needs.

Chapter 23 – Current administrative expenditure

This Chapter covers the costs of miscellaneous services related to the agreements signed with other Commission offices/services e.g. the CdT (translations) DG BUDG (ABAC & treasury), BOA for Accounting Services, S.G. (HAN), EFSA (EUAN SSO), and others.

It also covers of office supplies, stationery, badges, office material and other consumables necessary for the operation of the office. It also includes all correspondence, postage, delivery services costs and telecommunication costs (fixed, mobile telephony).

Chapter 24 – External administrative consultancy and auditing

This chapter covers the costs for external audit, external consultancies linked to administrative matters & outsourced support.

Chapter 25 – Internal meetings

This Chapter covers any expenditure linked to formal and internal events and meetings. It covers necessary catering costs and any additional costs regarding the organisation.

Chapter 26 – Legal services

This Chapter covers the costs for legal assistance, data protection and other legal obligations.

Chapter 27 – Communication, Information & Events

This Chapter covers the costs regarding Communication activities, events organization, dissemination and publication activities in connection with operational activities. It will also cover the costs of internal communication expenses.

Chapter 28 – Experts and associated costs

This Chapter covers the fees for the work done by experts, travel expenses and daily allowances if applicable. It also includes the reimbursement of expenses (travel and accommodation) for experts invited by the Euro HPC to meetings/events. (e.g. INFRAG/RIAG members and other experts).

c) Title 3: Operational Expenditure

The main purpose of the Joint Undertaking is the indirect implementation of EU budget in the field of High-Performance Computing. Detailed description of the operational activities undertaken in 2021 are presented in the Work Programme below.

Chapter 30 – Grants, R&I Activities

In 2024, this appropriation related to all expenses linked to the EuroHPC JU R&I activities.

Table 5a above sets out contributions made to HPC R&I activities established under Regulation 2018/1488 and Regulation 2021/1173.

Chapter 31 – HPC Infrastructure Activities

In 2024, this appropriation relates to the ongoing procurement in exascale, the mid-range systems, the quantum systems and upgrades and the industrial supercomputers.

Supercomputer maintenance is also foreseen to be paid annually from 2022.

Table 5b above sets out contributions made to HPC Infrastructure activities established under Regulation 2018/1488 and Regulation 2021/1173.

HUMAN RESOURCES

In 2024, the JU should be fully staffed (with only standard turnover rates), and the last pending selection procedures should be finalised.

In 2023 tools and processes have been put in place in order to successfully integrate newly recruited colleagues within the teams and ensure their contribution to the JU's objectives as soon as possible. This process will continue in 2024, to create team coherence and clarity in terms of roles and responsibilities, in line with individual, unit and JU objectives.

The implementation of the HR tools, policies and procedures, in line with the Implementing Rules adopted by the Governing Board will continue. Effort will be made to consolidate the competencies and know-how within the JU, as well as identify and address any potential gaps. Efforts will also be made to stimulate cross-functional interaction and knowledge sharing between colleagues, as well as maintain good team spirit.

Internal communication will be further strengthened in the area of Human Resources, in particular by means of Intranet pages and dedicated info sessions.

The HR strategy of the JU will be finalised and rolled out in 2024.

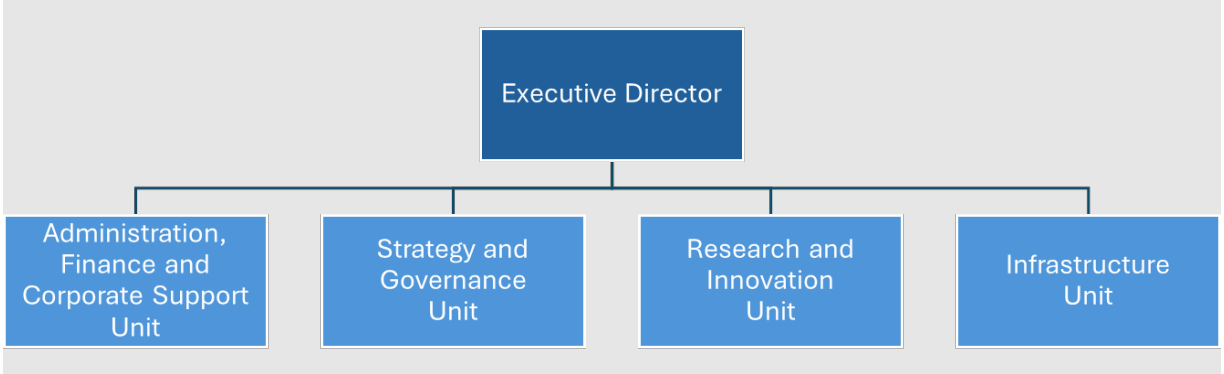
Emphasis will be put on providing sustainable working environment, as well as policies favouring staff well-being, personal and professional development and work/life balance.

The JU will also benefit from the shared expertise in the area of HR via the inter-agency network of HR professionals, as well as the Back Office Arrangement (BOA) with other JUs.

The JU will also benefit from sharing best practices via the EU Agencies network.

Official organigramme of the JU

The organigramme below presents the proposed organisational structure of the JU, up to the Head of Unit level**.**



Priorities for the 2024 recruitments

The remaining vacant posts should be filled in the course of 2024.

Human resources planning for the period of 2021-2027

	2021	2022	2023	2024	2025	2026	2027
Establishment plan posts Temporary Agents (TA)	4	22	27	27	27	27	27
Contract Agents (CA)	11	25	27	27	27	27	27
Seconded National Experts (SNE)	1	0	0	0	0	0	0
Total Staff	**16**	**47**	**54**	**54**	**54**	**54**	**54**

Breakdown of Temporary Staff by grade in 2023 and 2024

The total 2024 posts represent the posts approved by the Governing Board in the initial Annual Work Programme 2024.

Temporary Agents (TA) by grade	2023 TA posts	Filled-in posts as of 31/12/2023	2024 TA posts
AD 16			
AD 15			
AD 14	1	1	1
AD 13			
AD 12	1	1	1
AD 11			1

AD 10	2	1	1
AD 9	2	2	2
AD 8	10	4	10
AD 7	4	10	4
AD 6	5	3	5
AD 5			
Total (ADs)	**25**	**22**	**25**
AST 4	2	2	2
Total (ASTs)	**2**	**2**	**2**
Total TA	**27**	**24**	**27**

Breakdown of external staff by Function Group in 2023 and 2024

The JU remains within the planned maximum full-time equivalents (FTEs) in terms of contract agents, as foreseen in the Legislative Financial Statement (LFS), with 27 FTEs.

Contract Agents (CA) Staff	**2023 approved FTEs**	**Filled-in posts as of 31/12/2023**	**2024 approved FTEs**	**2024 amended FTEs**
Function Group IV	12	2	12	17
Function Group III	14	9	14	9
Function Group II	1	1	1	1
Total CA staff	**27**	**12**	**27**	**27**