

DK in EuroHPC

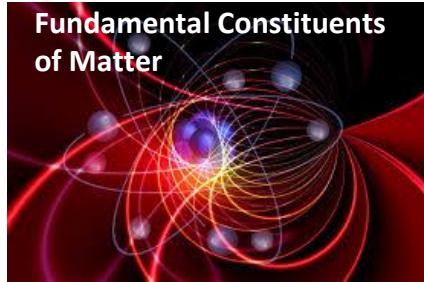
Access to International Supercomputing *Introduction*

Access to EuroHPC systems

- Objective of deploying a world-class High Performance (HPC) infrastructure and a competitive innovation ecosystem in supercomputing technologies, applications and skills in Europe.
- Access to pre-exascale and petascale supercomputers (the EuroHPC supercomputers), which will be located at and operated by supercomputing centres (Hosting Entities) in the Union.
- From 2021, access to users from academia, industry and public sector

Version	Comments, What has been added or adjusted
1.0, Oct 13th 2021	First version - details only for Benchmark and Development Calls
1.1, Oct 15th 2021	Smaller adjustments in text
1.2, Nov 17th 2021	Update: Refer to EuroHPC Access policy version 1.1. Regular Access Calls now available (as of Nov 10th)
1.3, Dec 3rd 2021	Slide 8 new. Inclusion of details for MeluXina, Discoverer and LUMI-C under "Benchmark and Development Calls". Slide 12 new. Specifying the documents needed for the Regular Access Calls





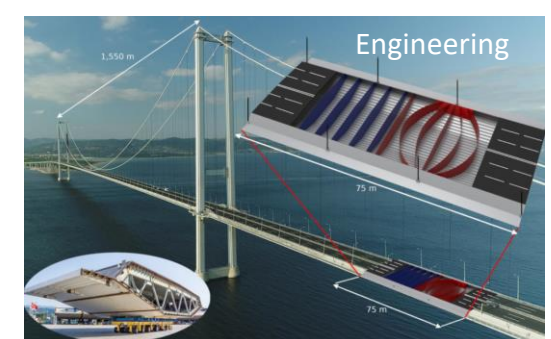
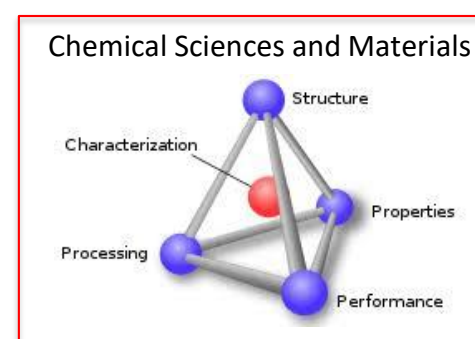
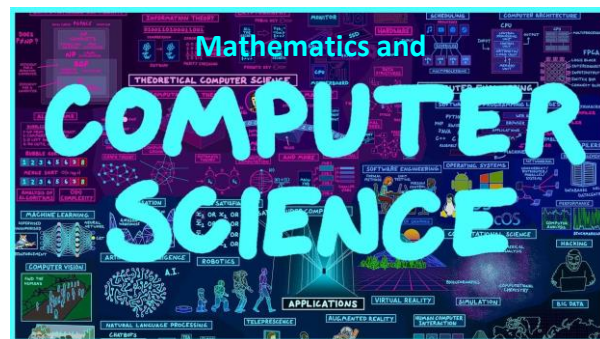
- Funded by EuroHPC JU
- All scientific domains
- Access to 7 HPC-facilities (incl. LUMI) during 2021/2022

Five are open: <https://eurohpc-ju.europa.eu/news/access-eurohpc-supercomputers-now-open>



- Preparatory Access (Development or Benchmark access)
- Regular Access
- Access policy Version 1.1 (35 pages):

<https://eurohpc-ju.europa.eu/sites/default/files/2021-10/Decision%2018.2021%20-%20Access%20policy.pdf>





- Benchmark Access **OPEN ! Preparatory Access Type A!**
- Development Access **OPEN ! Preparatory Access Type B!**
- Regular Access **OPEN !**
- Extreme Scale Access
- Fast Track Access for Academia
- Fast Track Access for Industry Access
 - a) Research and Innovation (R&I) access
 - b) Commercial Access



Access Mode	Extreme Scale	Regular	Benchmark	Development	Academic Fast Track	Industry Fast Track
Duration	1y renewable	1y renewable	2 to 3 months	1y renewable	< 6 months	1y renewable
Periodicity	Continuous calls, bi-yearly cut-offs	Continuous call, cut-offs every four months (3 cut-offs per year).	Continuous call, monthly cut-offs	Continuous call, monthly cut-offs	Continuous call, cut-offs ev. 2w/1m	Continuous call, cut-offs ev. 2w/1m
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Accessible to industry	Yes – Open R&D With specific evaluation criteria	Yes – Open R&D With specific track	Yes – Open R&D	Yes – Open R&D	No – use industry Fast Track instead	Exclusively Open R&D
External sc. Peer-review	Yes	Yes	No	No	No / Pre-identified	No / Pre-identified
Tech. assessment	Yes	Yes	Yes	Yes	Yes	Yes
Data Management Plan required	Yes	Yes	No	No	Yes	Yes
Application type	Full application	Full application	Technical application	Technical application	Light request + support documents	Full application
Prerequisite	Benchmark	Benchmark	None	None	Previous allocation or Benchmark	Previous allocation or Benchmark
Submission period	> 2 months	> 2 months	N/A	N/A	N/A	N/A
Duration of evaluation process	3 months	2 months	≥1 week <2 weeks	≥1 week <2 weeks	≥2 weeks <1 month	≥2 weeks <1 month

(From EuroHPC Access Policy, Version 1.1)



Call Type	Project Characteristics and Needs
Benchmark Access (Type A)	<ul style="list-style-type: none"> • Collection of performance data on a target system in order to document the technical feasibility of user applications to be submitted to other access modes. This is done to fit the given needs, limiting and preventing misuse of HPC resources. • Applicants will submit a light access request that will support the relevance of the application to the call. • The resources that can be requested via this mode is a limited share of the total available.
Development Access (Type B)	<ul style="list-style-type: none"> • For development of code and algorithms, and developing a science portal or other infrastructure software components. • Applicants will submit a light access request that will support the relevance of the application to the call. • The resources that can be requested via this mode is a limited share of the total available.
Regular Access (Type C)	<ul style="list-style-type: none"> • See Extreme Scale Access. • Need for large allocations in terms of compute time, data storage and support resources. • Maximum allocations accepted for this access will be aligned with the minimum allocations of the Extreme Scale access.
Extreme Scale Access	<ul style="list-style-type: none"> • Prerequisite: applicants will rely on technical data collected via a Benchmark Access. • Demonstrate that use of extremely large allocations is required to reach the objective of their application. • Demonstrate that the method, software and tools are technically adapted to the target supercomputer. • Provide a project plan, with adequate time schedule of the expected resource consumption.
Fast Track Access for Academia	<ul style="list-style-type: none"> • Applications should provide evidence of previous successfully completed (non-fast track) allocation. • The volume and type of resources should be similar to the one of a regular access. • For users with track record of successful application(s) to other access modes willing to get fast access to complement their current research results (e.g., gathering elements to answer reviewers in the process of publishing a paper).
Fast Track Access for Industry A. Research and Innovation (R&I) B. Commercial Access	<ul style="list-style-type: none"> • Applications should provide evidence of previous successfully completed (non-fast track) allocation. • The volume and type of resources should be similar to the one of a regular access. • To accommodate needs from a commercial entity to run a proof of concept in a very short time that is identified to be decisive in enabling the entity to take a decision. Also pay-per-use option without peer-review process. • Targets Open Research & Development, with focus on innovation criteria and collaboration with academia.

DeiC > What is Available and How to Apply



- Three call types:
Preparatory Access - Benchmark (Type A)
Preparatory Access - Development (Type B)
Regular Access
- Several HPC facilities via EuroHPC:
5 for Preparatory Access (Vega and Karolina)
5 for Regular Access (Vega, Karolina, MeluXina, Discoverer and LUMI-C)
- Submit proposal using the PRACE Peer Review Tool. <https://pracecalls.eu/>
- See tutorials on DeiC website:
<https://www.deic.dk/en/Supercomputing/Instructions-and-Guides/How-to-access-international-HPC-facilities>

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External sc. Peer-review	Yes	Yes	No	No	No / Pre-identified	No / Pre-identified
Tech. assessment	Yes	Yes	Yes	Yes	Yes	Yes
Data Management Plan required	Yes	Yes	No	No	Yes	Yes
Application type	Full application	Full application	Technical application	Technical application	Light request + support documents	Full application
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(From EuroHPC Access Policy, Version 1.1)

DeiC > EuroHPC systems to access

Table 2 - Performance characteristics

System name	Aggregated Theoretical Performance (PFlops)	Aggregated Sustained Performance (PFlops)	Largest partition Sustained performance	Largest partition Top500.org ranking (June '21)
Discoverer	6.0	4.5	4.5	#91
Karolina	15.7	9.4	6.0	#69
MeluXina	18.0	12.8	10.5	#36
Vega	10.1	6.9	3.8	#106
1) LUMI	552	375.0 (*)	N/A	N/A
1) Leonardo	322.6	249.5 (*)	N/A	N/A
Deucalion	10.0	7.2 (*)	N/A	N/A

(*) Estimated

1) Pre-exascale systems

The other EuroHPC facilities are Petascale systems



Source: The EuroHPC JU Supercomputers. Analysis of the Petascale and Pre-exascale systems. EuroHPC JU (September 2021)

Table 3 - Architecture characteristics

System	CPU partition	GPU partition	FPGA partition	Cloud partition	Data Centric partition	Storage
LUMI	x86_64	AMD Instinct	-	Yes	Yes	87 PB Lustre (multi-tiered) & 30 PB Ceph
Leonardo	x86_64	NVIDIA Ampere	-	-	Yes	111.4 PB Lustre (multi-tiered)
Deucalion	ARM & x86_64	NVIDIA A100	-	-	-	11.3 PB Lustre (multi-tiered)
Discoverer	x86_64	-	-	-	-	2 PB Lustre
Karolina	x86_64	NVIDIA A100	-	Yes	Yes	1.3 PB Lustre (all flash)
MeluXina	x86_64	NVIDIA A100	Intel Stratix 10MX	Yes	Yes	20 PB Lustre (multi-tiered) & 96 TB Ceph
Vega	x86_64	NVIDIA A100	-	Yes	-	1 PB Lustre & 19 PB Ceph

All systems rely on InfiniBand HDR (100 or 200) for the application fabric and are connected to GÉANT with at least 100 GB/s links.



The resources to be allocated per project and per cut-off for the **Vega** system are shown in the table below:

System/partition	Benchmark		Development	
	Node hours	Core hours	Node hours	Core hours
Vega CPU Standard	7 000	896 000	15 000	1 920 000
Vega CPU Large Memory	2 500	320 000	5 000	640 000
Vega GPU	1 000	128 000	3 000	384 000

The resources to be allocated per project and per cut-off for the **Karolina** system are shown in the table below:

System/partition	Benchmark		Development	
	Node hours	Core hours	Node hours	Core hours
Karolina CPU	7 000	896 000	15 000	1 920 000
Karolina GPU	1 000	128 000	3 000	384 000
Karolina analytics	9	6 912	22	16 896

<https://prace-ri.eu/benchmark-and-development-access-information-for-applicants/>

The resources to be allocated per project and per cut-off for the **MeluXina** system are shown in the table below. Benchmark and Development calls' access time will be provided on basis of Node-Hours numbers (Core-Hours are calculated).

System/partition	Benchmark		Development	
	Node hours	Core hours	Node hours	Core hours
MeluXina Cluster Module	7 000	896 000	15 000	1 920 000
MeluXina Accelerator Module – GPU	1 000	64 000	3 000	192 000
MeluXina Large Memory Module	100	12 800	300	38 400

The resources to be allocated per project and per cut-off for the **Discoverer** system are shown in the table below:

System/partition	Benchmark		Development	
	Node hours	Core hours	Node hours	Core hours
Discoverer	7 000	896 000	15 000	1 920 000

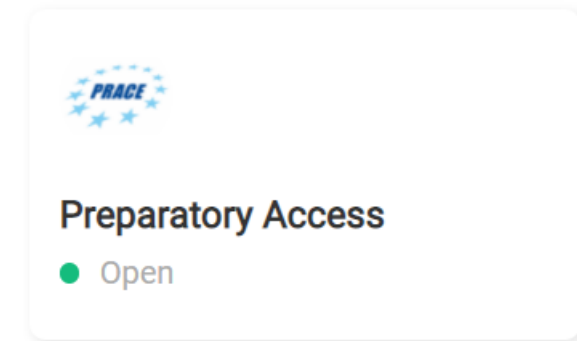
The resources to be allocated per project and per cut-off for the **LUMI-C** system are shown in the table below:

System/partition	Benchmark		Development	
	Node hours	Core hours	Node hours	Core hours
LUMI-C	7 000	896 000	15 000	1 920 000

- Continuously open calls on a monthly basis
- Cut-off date for review on 1st of every month
- Maximum time-to-resources-access (start-date) of two weeks after the date of submission
- Access periods for 2 or 3 months

“The Benchmark access mode is meant for users to collect performance data on a target system in order to document the technical feasibility of their applications to be submitted to other access modes. “ (Access Policy, Version 1.1)

An online form via PRACE



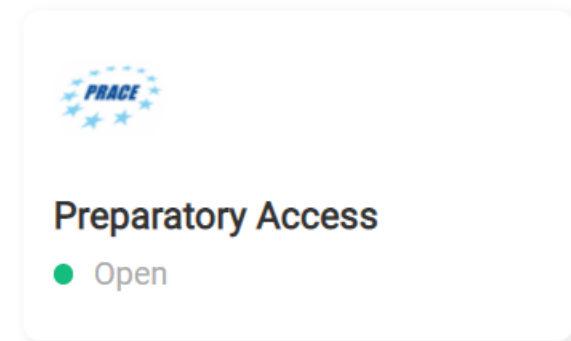
<https://prace-ri.eu/hpc-access/eurohpc-access/eurohpc-ju-benchmark-and-development-access-calls/>



- Continuously open calls on a monthly basis
- Cut-off date for review on 1st of every month
- Maximum time-to-resources-access (start-date) of two weeks after the date of submission
- All applicants can apply for EuroHPC resources in open calls (Also additional LUMI access on top of assigned resources for DK)
- Access periods may be granted for up to 1 year and, renewable up to 2 times

“ The Development access mode is meant for projects focusing on code and algorithm development and developing a science portal or other infrastructure software components. “ (Access Policy, Version 1.1)

An online form via PRACE



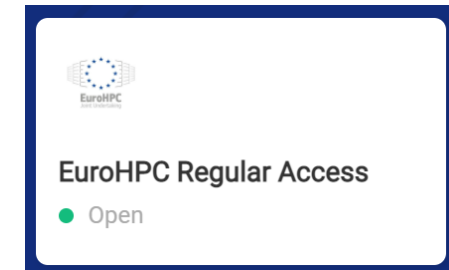
<https://prace-ri.eu/hpc-access/eurohpc-access/eurohpc-ju-benchmark-and-development-access-calls/>



- Continuously open calls with three (3) cut-off dates per year
- Maximum time-to-resources-access (start-date) of two months after the date of submission
- All applicants can apply for EuroHPC resources in open calls (Also additional LUMI access on top of assigned resources for DK)
- Access periods are granted for 1 year and one can apply for continuation of projects up to 1 year extra

“The Regular access mode is meant to serve research domains or communities that require large-scale resources or that require more frequent access to substantial computing and storage resources. Regular Access calls will allocate resources primarily from EuroHPC JU petascale systems. “ (Access Policy, Version 1.1)

**All proposals consist of 2 parts:
An online form and the
'Project scope and plan'.**



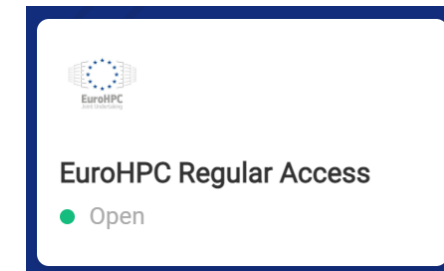
<https://prace-ri.eu/hpc-access/eurohpc-access/eurohpc-ju-call-for-proposals-for-regular-access-mode/>

- Remember to inspect the required documents
(Find info in the bottom of the webpage)

The following documents form the reference for this call:

- The EuroHPC Access Policy can be found [here](#)
- The Terms of Reference can be found [here](#)
- The Technical Information on the EuroHPC Supercomputers can be found [here](#)
- The template for the Project Scope and Plan can be found below:
 - In [Microsoft Word format](#)
 - In [Latex format](#) (and associated .cls file) – **Coming Soon**

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<https://prace-ri.eu/hpc-access/eurohpc-access/eurohpc-ju-call-for-proposals-for-regular-access-mode/>

“The JU will reserve up to **20%** of available computing resources for commercial purposes.”

“The purpose of commercial access is to give the opportunity to any organization be it **industrial entity** or **research/academic entity** to gain access to HPC resources without the necessity of following the peer-review based access procedures of the JU and the restrictions (temporal and/or functional) imposed by them. ..., any entity can buy access to the JU super-computing resources provided that the usage falls within the JU acceptable usage policy (AUP)

(Access Policy, Version 1.1)



Commercial allocation will be charged separately for computation, storage and network resources, and support services. The table below summarises the indicative types of resources which will have different pricing levels.

Category	Type	Cost unit
Computation	CPU Nodes	Node-hours
Computation	GPU Nodes	Node-hours
Computation	FPGA Nodes	Node-hours
Computation	High-memory nodes	Node-hours
Storage	Fast access tier	Gigabyte (GB)
Storage	Regular access tier	Gigabyte (GB)
Storage	Archive tier	Gigabyte (GB)
Network	Outbound and Inbound data transfer	Gigabyte (GB)
Support	Application porting and optimisation	Person Months (PM)
Support	Training	Hours

How to make a EuroHPC application

(Full Application) Extreme Access and Industry

.....cannot at this stage provide any additional information (not yet implemented). For additional information please keep an eye on future updates on: <https://prace-ri.eu/hpc-access/eurohpc-access>

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(From EuroHPC Access Policy, Version 1.1)

- DK in EuroHPC: Access to International Supercomputing – Introduction (This presentation)
- How to make a EuroHPC application. Preparatory Access Level. Benchmark (Type A) and Development (Type B)
- How to make a EuroHPC application. Regular Access.
- Others to come.....

<https://www.deic.dk/en/Supercomputing/Instructions-and-Guides/How-to-access-international-HPC-facilities>



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Content	Link
PRACE Pier Review Tool (To register and start application)	https://pracecalls.eu/
Overview of EuroHPC supercomputers	https://eurohpc-ju.europa.eu/discover-eurohpc-ju#ecl-inpage-211 https://eurohpc-ju.europa.eu/news/access-eurohpc-supercomputers-now-open
Access policy to EuroHPC supercomputers (Version 1.1).	https://eurohpc-ju.europa.eu/sites/default/files/2021-10/Decision%2018.2021%20-%20Access%20policy.pdf
The EuroHPC JU Supercomputers (Systems Report)	https://eurohpc-ju.europa.eu/sites/default/files/2021-10/EuroHPC%20Systems%20Report-Sep2021.pdf
EuroHPC JU Benchmark And Development Access Calls (monthly)	https://prace-ri.eu/hpc-access/eurohpc-access/eurohpc-ju-benchmark-and-development-access-calls/
Information For Applicants: Benchmark And Development Access	https://prace-ri.eu/benchmark-and-development-access-information-for-applicants/
Scientific publications including International HPC in DK	https://www.deic.dk/en/Supercomputing/HPC-Publications
EuroHPC web page	https://eurohpc-ju.europa.eu/
The European Joint Undertaking on High-Performance Computing (2020)	https://eurohpc-ju.europa.eu/sites/default/files/2020-09/EuroHPC%20Factsheet%20September%202020.pdf
EuroHPC access	https://prace-ri.eu/hpc-access/eurohpc-access/
About EuroHPC on DeiC web page	https://www.deic.dk/en/Supercomputing/International-HPC-Facilities
International HPC landscape on Danish EuroCC website	https://www.deic.dk/en/Supercomputing/EuroCC/HPC-Landscapes
International use case examples	https://digital-strategy.ec.europa.eu/en/library/high-performance-computing-best-use-examples
The scientific case for computing in Europe 2018 – 2026 (61 pp.)	https://prace-ri.eu/about/scientific-case/