

Top500
#3

LUMI

supercomputer for European researchers

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11TH EGU GALILEO CONFERENCE



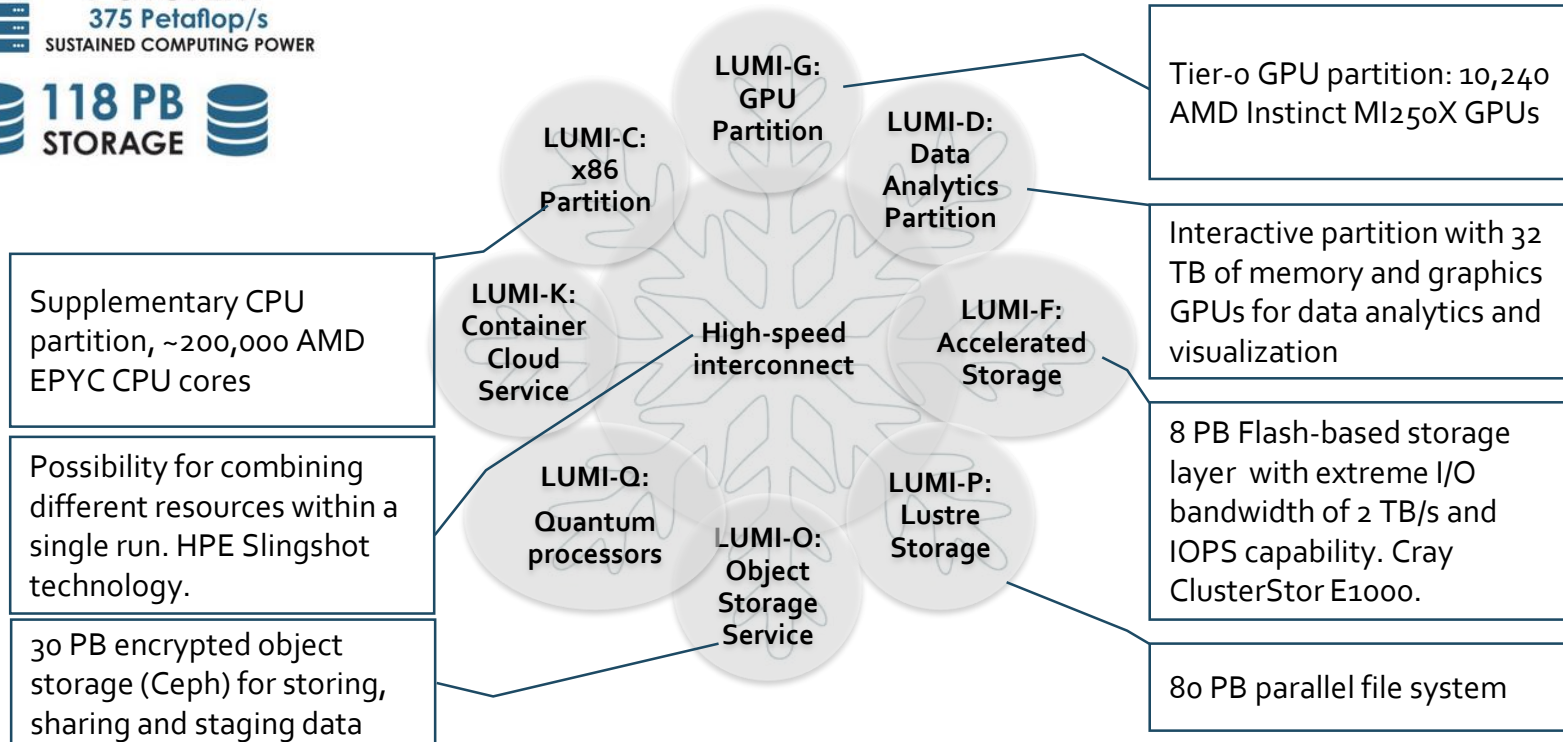
Solid Earth and Geohazards
in the Exascale Era

LUMI in a nutshell

LUMI

1 SYSTEM
375 Petaflop/s
SUSTAINED COMPUTING POWER

118 PB STORAGE



LUMI national access



<https://lumi-supercomputer.eu/get-started>

- Consortium share through national calls
 - Select specific consortium member country

LUMI About LUMI Get Started News and Articles Events and Training Newsletters User Support

Get Started

Get Started **Select** ▼

LUMI offers several computing partitions and capacities. All the capacities are accounted in three types of units, GPU (graphics processing unit) hours, CPU hours (central processing units) and storage hours. All projects on LUMI need to be applied and resourced as a combination of these three units. A potential LUMI user has two routes to apply for the resources.

LUMI resources are divided into national resources administered by the national mechanisms and to the European-wide Euro-HPC quota.

One half of the LUMI resources belong to the [LUMI consortium countries](#). This half is divided based on the member countries' contributions to the LUMI funding. The resources in this pool are allocated through national mechanisms and according to local policies.

Researchers affiliated with an academic research organisation or companies established or located in a LUMI consortium country can apply for these national resources. For more information, select the country.

The other half of the LUMI resources are allocated by the Euro-HPC Joint Undertaking. Researchers in European countries, i.e. [the EU member states](#) and the [associated countries to H2020](#), including LUMI consortium countries, and companies established or located in a European country, can apply for the resources in this pool. For more information, see "Users in Europe".

Read more about [LUMI](#).

LUMI national access

- Consortium share through national calls
 - Select specific consortium member country
 - Or directly access from list below

The image displays a grid of 12 LUMI national access cards, each representing a different country or region. Each card features the national flag at the top, followed by the LUMI logo. Below the logo, the country name is listed, along with an update date and a 'Read more' button. The cards are arranged in a 3x4 grid.

Country/Region	Update Date
Europe	Updated 1.1.2021
Belgium	Updated 26.10.2022
Czech Republic	Updated 11.07.2021
Denmark	Updated 22.12.2022
Estonia	Updated 26.10.2021
Finland	Updated 27.4.2021
Iceland	Updated 24.11.2021
Norway	Updated 11.10.2022
Poland	Updated 4.10.2022
Sweden	Updated 26.10.2021
Switzerland	Updated 26.4.2022



LUMI national access



- Consortium share through national calls
 - Select specific consortium member country
 - Or directly access from list below
 - Differs between consortium countries

The image shows two screenshots of LUMI user guides. The top screenshot is titled "Users in Estonia" and provides information on how to access LUMI resources in Estonia. It mentions that users can apply as either an academic user affiliated with an Estonian higher-education or research institute, or as a commercial user from an organization established or located in Estonia. It also provides contact information for technical support: support@hpc.ut.ee. The bottom screenshot is titled "Users in Norway" and provides information on how to access LUMI resources in Norway. It mentions that users can apply as either an academic user affiliated with a Norwegian higher-education or research institute, or as an industry user from an organization established or located in Norway. It also provides contact information for technical support: support@hpc.ut.ee.

Get started → Users in Estonia

Users in Estonia

Information for users in Estonia on how to access LUMI.

You can apply for the national LUMI resources either as an academic user affiliated with an Estonian higher-education or research institute or as a commercial user from an organization established or located in Estonia. Please see the details below under the respective section.

For users' technical support contact the Estonian LUMI User Support. E-mail: support@hpc.ut.ee

Academic users

LUMI offers GPUs, CPUs as well as storage capacity for researchers affiliated with an Estonian higher-education or research institute.

Researchers can apply for LUMI resources: 1) via Estonia's national share; 2) via EuroHPC's [technical and scientific peer-review process](#).

As an academic user, you can also use LUMI resources in collaboration with other academic and industrial users in Estonia, Europe and beyond. Nevertheless, this requires the project's principal investigator to be affiliated with an Estonian academic research institution.

For more information please contact the [Estonian Scientific Computing Infrastructure \(ETAIS\)](#) by emailing etais@etais.ee.

Commercial users

Get started → Users in Norway

Users in Norway

You can apply for the national LUMI resources either as an academic user affiliated with a Norwegian higher-education or research institute or as an industry user from an organization established or located in Norway.

Academic users

Please visit national e-infrastructure provider Sigma2's website for more information on how researchers in Norway can get access to LUMI.

Industrial users

LUMI national access

- Consortium share through national calls
 - Select specific consortium member country
 - Or directly access from list below
 - Differs between consortium countries
 - Benchmark, development and regular are continuous
 - Extreme/GC are separate calls

Users in Finland

You can apply for the national LUMI resources either as an **academic user** affiliated with a Finnish higher-education or research institute or as an **industry user** from an organization established or located in Finland.

When applying for the Finnish resources, there are four different **access modes** to choose from:

Regular Access mode, for resource applications with a case to enable progress of science in the domains covered. These applications are expected to be able to justify the need for large allocations in terms of compute time, data storage and support resources because they are significantly contributing to the progress of science in their domain.

- middle size projects, duration fixed 12 months
- max 8 million core-h, 0.5 million GPU-h, 570 000 TiB-h

Benchmark Access mode is meant for users to collect GPU performance data on LUMI in order to document the technical feasibility of their proposals to be submitted to LUMI Extreme Scale Access calls.

- to show readiness for Extreme Scale Access in LUMI-G (cf. PRACE preparatory access), duration fixed 3 months
- max 0.5 million core-h, 0.05 million GPU-h, 22 000 TiB-h

Development Access mode is meant for projects focusing on code and algorithm development and developing a science portal or other infrastructure software components.

- minor projects to develop software for LUMI, duration 1 year, extendable for other years
- max 1 million core-h, 0.1 million GPU-h, 90 000 TiB-h

Extreme Scale Access is a high-impact, high-gain innovative research, open to all fields of science justifying the need for the capacity to use extremely large allocations in terms of compute time (especially GPU) and data storage resources.

- largest projects using especially GPUs (LUMI-G), duration fixed 12 months
- 50% of Finnish LUMI GPU resources, 25% of Finnish CPU resources
- 0.5–3 million GPU-h, max 16 million CPU core-h
- calls for projects once a year

LUMI European access



- EuroHPC JU access
 - Sub-link [users-in-europe](#)
 - Or select from list

The image shows a grid of 12 LUMI user access cards for various European countries. Each card features the national flag, the LUMI logo, and specific information for users in that country. The 'EuroHPC' card is circled in blue. The cards are arranged in a 4x3 grid.

Country	Updated	Access Information
EuroHPC	Updated 11.1.2023	Information for all users in Europe how to apply for the resources allocated by the...
Belgium	Updated 30.10.2022	Information for users in Belgium on how to access LUMI. The...
Czech Republic	Updated 11.10.2021	Call for LUMI Czech Republic allocations on issued by e-INFRA CZ, and...
Denmark	Updated 22.11.2022	Information for users in Denmark on how to access LUMI. The...
Estonia	Updated 20.10.2021	Information for users in Estonia on how to access LUMI. The...
Finland	Updated 27.4.2023	The can apply for the national LUMI resources either as an academic user affiliated with...
Iceland	Updated 24.10.2020	The can apply for the national LUMI resources either as an academic user affiliated with...
Norway	Updated 11.10.2022	The can apply for the national LUMI resources either as an academic user affiliated with...
Poland	Updated 8.10.2022	The can apply for the national LUMI resources either as an academic user affiliated with...
Sweden	Updated 26.10.2021	Call for LUMI Sweden allocations can be issued by SRC - The Swedish...
Switzerland	Updated 26.4.2022	The can access the national LUMI resources as an academic user by applying for CSCS...

LUMI European access



- EuroHPC JU access
 - <https://lumi-supercomputer.eu/get-started-2021/users-in-europe>
- [EuroHPC JU access policy](#)
 - to users established in the Union or a country associated to Horizon 2020
 - primarily based on open calls
 - exceptional cases such as strategic European initiatives or in emergency and crisis management situations

Get started → Users in Europe


Users in Europe

Information for all users in Europe how to apply for the resources allocated by the EuroHPC Joint Undertaking (EuroHPC JU).

[General information about EuroHPC calls](#)

- [EuroHPC Extreme Scale Access to LUMI](#)
- [EuroHPC Regular Access to LUMI](#)
- [EuroHPC Benchmark and Development Access to LUMI](#)

Video tutorial how to apply for EuroHPC resources:



(video credit: EuroCC Sweden)

LUMI European access



Benchmark & development

- Continuous proposal submission
- Low threshold
- Cut-off date is first of month
 - Administrative validation: 2 days
 - Review & decision: 2 weeks
 - Access: latest after 3 weeks

System	Architecture	Site (Country)	Benchmark	Development
LUMI-C	HPC Cray EX	CSC (FI)	✓	✓
LUMI-G	HPC Cray EX	CSC (FI)	✓	✓
Vega CPU	BullSequana XH2000	IZUM Maribor (SI)	✓	✓
Vega GPU	BullSequana XH2000	IZUM Maribor (SI)	✓	✓
Karolina CPU	HPE Apollo 2000 Gen10 Plus, x86_64	IT4I VSB-TUO (CZ)	✓	✓
Karolina GPU	HPE Apollo 6500 Gen10 Plus, Nvidia GPGPU	IT4I VSB-TUO (CZ)	✓	✓
Discoverer	Atos BullSequana XH2000	Bulgaria	✓	✓
MeluXina CPU	Atos BullSequana XH2000	Luxembourg	✓	✓
MeluXina GPU	Atos BullSequana XH2000	Luxembourg	✓	✓
MeluXina FPGA	Atos BullSequana X430 A5	Luxembourg	✓	✓

<https://prace-ri.eu/hpc-access/eurohpc-access/eurohpc-ju-benchmark-development-access-calls/> (May 11th 2023)

LUMI European access



Regular Access

- Current call:
 - Cut-off July 7
 - Allocations from November 1
 - Access for single year
 - Next call: November 3
- PI can only have one regular access via EuroHPC
- Consortium and EuroHPC calls are not exclusive!

EuroHPC JU Call for Proposals for Regular Access Mode – 2023-07-07 Cutoff

Types of Access: EuroHPC Regular Access

Opening Date: 07/04/2023 @ 10:00 Luxembourg Time

Closing Date: 07/07/2023 @ 10:00 Luxembourg Time

Time until call closes: 56 Days, 20 Hours, 1 Minutes, 55 Seconds.

System	Architecture	Site (Country)	Total resources offered (node hours)	Total resources offered (core hours)	Minimum resources request (node hours)	Minimum resources request (core hours)
LUMI-C	HPE Cray EX	CSC (FI)	376,719	48,220,033	37,000	4,736,000
LUMI-G	HPE Cray EX	CSC (FI)	738,665	47,274,560	50,000	3,200,000

<https://prace-ri.eu/call/eurohpc-ju-call-for-proposals-for-regular-access-mode-2023-07-07-cutoff/> (May 11th 2023)

LUMI European access



Extreme Scale Access

- Open to all fields (science, industry, public sector)
- EU Member State or in a country associated with Horizon 2020.
- PI has an employment contract in the organization + 3 month after allocation ends
- Companies: solely for open R&D purposes.

OPEN CALLS FOR PROPOSALS

Show per page [Reset](#) Search:

Title	Opening Date	Closing Date Time
EuroHPC Extreme Scale Access – 2023-05-12	04/04/2023	12/05/2023 - 10:00

The next indicative cut-off dates for proposals are: 28 September 2023 – 10:00 AM (Luxembourg time) 1 call

CLOSED CALLS FOR PROPOSALS

Show per page [Reset](#) Search:

Title	Opening Date	Closing Date Time
EuroHPC Extreme Scale Access – 2022-11-30	28/09/2022	15/12/2022 - 10:00

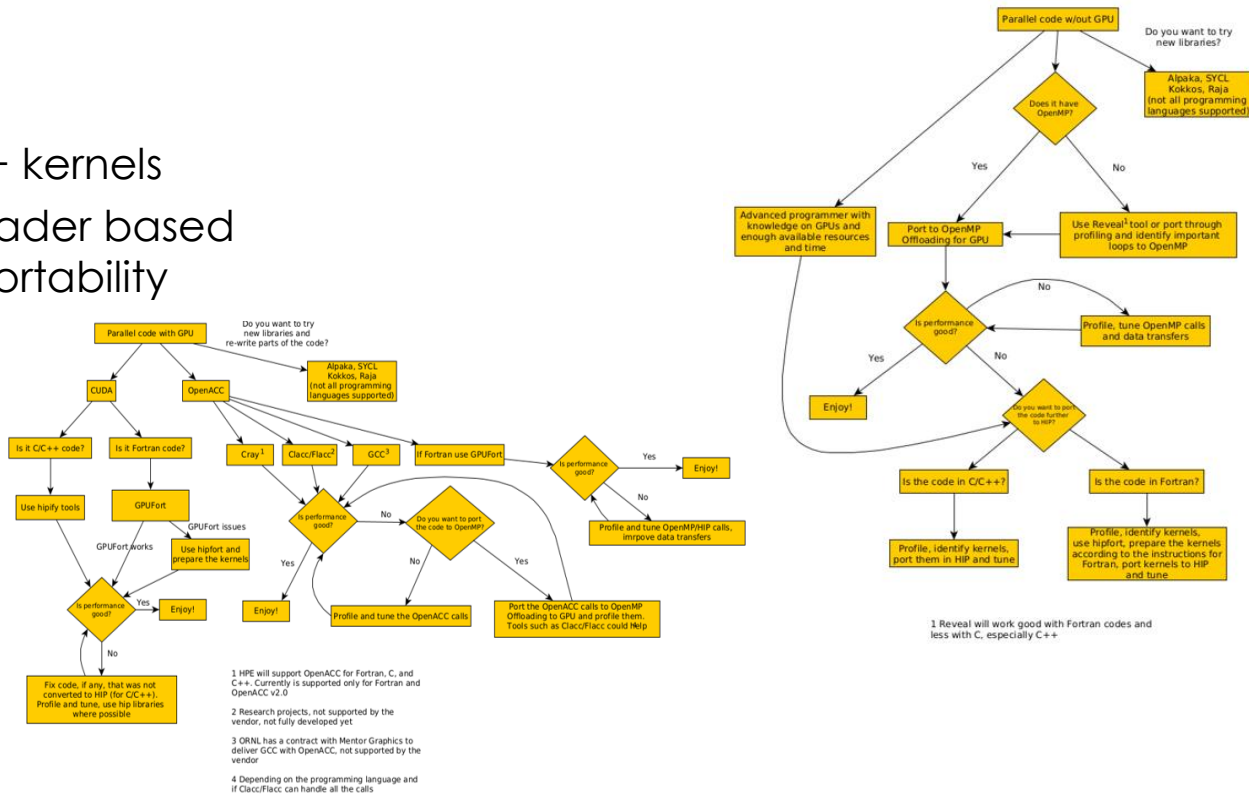
1 call

<https://prace-ri.eu/hpc-access/eurohpc-access/eurohpc-extreme-scale-access/> (May 11th 2023)

LUMI GPU programming



- CUDA/HIP
 - C++
 - Fortran with C++ kernels
 - Hipify or e.g. header based CUDA <-> HIP portability
- OpenMP
 - C/C++
 - Fortran
- OpenACC
 - Fortran only
- Kokkos, SYCL
 - C++



LUMI software & installations



- Software list

- <https://lumi-supercomputer.github.io/LUMI-EasyBuild-docs/>

- CSC local installations

- Amber
 - Elmer
 - OpenFOAM
 - PALM
 - PyTorch
 - TensorFlow

- Installations

- ...

LUMI Package overview

Search

a b c d e f g h i j l m n o p q r s t u v w x y z

- BCFtools
- BLIS
- Blosc
- Boost
- Brotli
- buildtools
- bzip2

C

- c-ares
- cairo
- CDO
- CGAL
- Charm++
- CMOR

Table of contents

a
b
c
d
e
f
g
h
i
j
l
m
n
o
p
q
r
s
*

LUMI support



- General information
 - lumi-supercomputer.eu
- Training & events
 - lumi-supercomputer.eu/events
- Documentation
 - docs.lumi-supercomputer.eu
- LUMI User Support Team
 - lumi-supercomputer.eu/user-support/need-help

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LUMI



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EuroHPC
Joint Undertaking



The acquisition and operation of the EuroHPC supercomputer is funded jointly by the EuroHPC Joint Undertaking, through the European Union's Connecting Europe Facility and the Horizon 2020 research and innovation programme, as well as the Participating States FI, BE, CH, CZ, DK, EE, IS, NO, PL, SE.

Leverage from
the EU
2014–2020



European Union
European Regional
Development Fund

**REGIONAL COUNCIL
OF KAINUU**

EURO