GCS
Gauss Centre for Supercomputing

33rd Call for GCS Large-Scale Projects

Leading edge supercomputing

The Gauss Centre for Supercomputing (GCS) provides computing power and services of the highest performance class for computational sciences and engineering at its three member sites in Garching (Leibniz Supercomputing Centre, LRZ), Jülich (Jülich Supercomputing Centre, JSC), and Stuttgart (High Performance Computing Center Stuttgart, HLRS). To ensure an efficient utilisation of these highly valuable resources, GCS provides its users with world-leading support, education, and dissemination of best practices and methods in simulation science. Here, the three members focus on different topics with some overlap on the subjects due to the centres' traditional user base or specific system requirements. While LRZ supports all scientific fields equally, JSC focusses on fundamental and applied sciences and HLRS specialises in engineering sciences and global system science. GCS aims, in particular, at innovative and scientifically challenging large-scale projects that cannot be carried out within smaller infrastructures. Such projects will also gain most from the existing successful support structures within the GCS and from their continuous synchronisation and optimization. Please be aware of the different priorities of the GCS member sites when you apply for computing time.

State-of-the-art systems

The GCS offers highest-level computing and a networking infrastructure.
JSC provides for the first time resources on Europe's first exascale supercomputer JUPITER (Joint Undertaking Pioneer for Innovative and Transformative Exascale Research). Its Booster will consist of about 6000 nodes, each equipped with four NVIDIA GH200 Superchips (72 cores each, 288 cores/node, 4 NVIDIA GH100, 96 GB HBM3 each) resulting in this immense overall computing power of about 1 EF/s.
Additionally, resources on JUWELS (Jülich Wizard for European Leadership Science) are offered. Its 2511 nodes on the Cluster Module are equipped with dual-socket Intel-Skylake Platinum 8168 CPUs. Furthermore, the JUWELS Booster Module comprises 936 nodes each equipped with two AMD EPYC Rome 7402 CPUs with 512 GB DDR memory each and 4 NVIDIA Ampere A100 GPUs. In total, JUWELS provides a computing power of 87 PF/s. Please note that the operation mode of the JUWELS Cluster Module will change during 2025. This results in some implications regarding the offered computing time and how it will be made available to granted projects.
Further detailed information is provided in the attached JUPITER and JUWELS Fact-Sheets.
LRZ provides SuperMUC-NG. SuperMUC-NG Phase 1 features 6,480 dual-socket nodes with Intel Xeon 8174 processors (48 cores/node). Out of these, 6,336 "thin" nodes are equipped with a main memory of 96 GByte and 144 "fat" nodes with a main memory of 768 GByte. SuperMUC-NG delivers a peak performance of 26.9 PF/s. SuperMUC-NG Phase 2 features dual Intel Xeon Platinum 8480+ nodes with 512 GByte memory. Each node has four Intel Data Centre GPU Max 1550 accellerators.
HLRS will provide its brand new Hunter system. Hunter will have 752 APUs AMD MI300A (Accelerated Processing Unit) which integrate CPU Cores, GPU Cores and 128 GB High Bandwidth Memory within one socket. This node design allows HPC and AI workloads using the same socket. In addition, a smooth transition of HPC workloads to the era of acceleration is possible. The Slingshot network of Hunter permits applications using the whole Hunter system efficiently.
Applicants who do not have a predecessor project at HLRS are expected to obtain access to Hunter as soon as it becomes available to make sure their applications are ready for Hunter at the beginning of the allocation. This has to be described in the application.

HLRS lrz JÜLICH Forschungszentrum

The systems within the GCS are continuously being upgraded in a round robin fashion.

Large-Scale Projects

Large-scale projects and highly scalable parallel applications are characterised by large computing time requirements, not only for short time frames, but usually for longer time periods. In detail, projects are classified as "large-scale" if they require 2% of the systems' annual production in terms of estimated availability. This requirement can be translated into different values.
For large-scale projects on the systems SuperMUC-NG Phase 1 and Phase 2 at LRZ, the following minimal requirements are given:

- >= 45 million core-hours on **SuperMUC-NG Phase 1**
- >= 140,000 GPU hours on **SuperMUC-NG Phase 2**

For the new system **Hunter** at HLRS, the accounting unit is Hunter-node-hours. As a node contains four MI300A APUs, the lower limit for large-scale projects is:

- >= 25.000 Hunter-node-hours on **Hunter**

For JUPITER and JUWELS at JSC, projects' requirements are specified in FLOP per year.

Therefore, the minimal requirements for large-scale projects should be:

- >= 847×10^{21} FLOP per year on **JUPITER**
- >= 45×10^{21} FLOP per year on **JUWELS**

Please note that FLOP refer to the peak performance. However, resources will be allocated and accounted in core-hours only.

For these large-scale projects a competitive review and resource allocation process is established by the GCS. Requests above these limits will be processed according to joint procedures of the GCS and will be reviewed in a national context. Requests below these limits and requests for test projects will be directly processed by the individual member centres.

Call for Large-Scale Projects

A "Call for Large-Scale Projects" is published by the Gauss Centre twice a year. Dates for closure of calls are usually at the end of winter and at the end of summer. The current 32nd call will be open

January 13th to February 17th 2025, 17:00 o'clock CET (strict deadline)

Eligible are applications from **German** universities and publicly funded **German** research institutions, e.g., Max-Planck Society, and Helmholtz Association.

Answering the Call

Leading, ground-breaking projects should deal with complex, demanding, innovative simulations that would not be possible without the GCS infrastructure and which can benefit from the exceptional resources provided by GCS.

Applications for a large-scale project may only be submitted by filling in the appropriate

electronic application form that can be accessed from the GCS web page

https://www.gauss-centre.eu/for-users/hpc-access/

Please use the template for the project description of your GCS large-scale application which can be accessed from the above web page and are provided in pdf, docx, and LaTeX format.
Note that the regular application forms of the GCS member centres can be found here as well.

Please note:

- Projects with a running large-scale grant must **clearly indicate and justify this**.
- Projects targeting multiple GCS platforms must **clearly indicate and justify this**.
- Projects applying for an extension **must clearly indicate the differences to the previous applications** in the project description and must have submitted their reports of the previous application.
- Accepted large-scale projects **must fulfil their reporting obligations**.
- Project descriptions must not exceed 18 pages.
- **Existing grants or current applications to all German computer centres as well as PRACE and EuroHPC have to be declared in the online application form**.

The proposals for large-scale projects will be reviewed with respect to their technical feasibility and peer-reviewed for a comparative scientific evaluation. On the basis of this evaluation by the GCS committee the projects will be approved for a period of one year and given their allocations.

Criteria for approvals

Applications for compute resources are evaluated only according to their scientific excellence and technical feasibility.

- The proposed scientific tasks must be scientifically challenging, and their treatment must be of substantial interest.
- Clear scientific goals and verifiable milestones on the way to reach these goals must be specified.
- The implementation of the project must be technically feasible on the available computing systems, and must be in reasonable proportion to the performance characteristics of these systems.
- The Principal Investigator must have a proven scientific record, and she/he must be able to successfully accomplish the proposed tasks. In particular, applicants must possess the necessary specialized know-how for the effective use of high-end computing systems. This has to be proven in the application for compute resources, e.g. by presenting work done on smaller computing system, scaling studies etc.
- The specific features of the high-end computers should be optimally exploited by the program implementations. This will be checked regularly during the course of the project.

Further help:

For further help please contact the member sites via https://www.gauss-centre.eu/service/contact/.