20th Call for GCS Large-Scale Projects

Supercomputing at the leading edge

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 a most 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 centers' traditional user base or specific system requirements. While LRZ mainly supports applied sciences, JCS focusses on fundamental 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 benefit 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 a highest-level computing and networking infrastructure.
JSC provides computing time on the recently established JUWELS (Jülich Wizard for European Leadership Science) Cluster. Its 2500 nodes are equipped with dual-socket Intel-Skylake Platinum 8168 CPUs. About 2 % of the nodes are equipped with 4 additional NVIDIA Volta GPUs yielding a total performance of about 12 PF/s. In a further step, the JUWELS Cluster will be extended by a booster component by 2019/2020. The technical specifications for the booster are not available yet.
LRZ's current SuperMUC consists of 155,656 Intel Xeon SandyBridge cores and delivers a peak performance of 3.2 Petaflop/s. This partition of the system will be shut down end of 2018. SuperMUC Phase 2 of SuperMUC will continue to run, delivering a peak performance of 3.6 Petaflop/s with 86,016 Intel Xeon Haswell cores. However most important, LRZ's next generation system, SuperMUC-NG, will start operation during this allocation period (probably end of 2018/begin of 2019) and will take over most of the large-scale production work. It will be equipped with 6448 dual-socket nodes with Intel Xeon 8174 processors (48 cores/node) consisting of 6304 thin nodes with a main memory of 96 GByte and additional 144 fat nodes with a main memory of 715 GByte. SuperMUC-NG will provide a peak performance of 26.7 PF/s.
HLRS offers its Cray System Hazel Hen, an XC40 based on Intel Haswell Processors and the Aries interconnect, with 7.4 PF/s peak performance. The 7712 compute nodes provide 128 GByte main memory each and a total of 185,088 cores.
The systems within the GCS are continuously 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 often for longer time periods. Projects are classified as "Large-Scale" if they require 35 million core-hours or more per year. For these large-scale projects a competitive review and resource allocation process is established by the GCS. Requests above this limit will be processed according to joint procedures of the GCS

and will be reviewed in a national context. Requests below this limit 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 20th call will be open

July 9th to August 13th 2018, 17:00 o'clock CEST (strict deadline)

Eligible are applications from **German** universities and publicly funded **German** research institutions, e.g., Max-Planck Society, and Helmholtz Association[1].

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.

Application for a large-scale project must be done by filling in the appropriate electronic application form that can be accessed from the GCS web page

http://www.gauss-centre.eu/large-scale-application

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

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.
- **Grants from or applications to all German computing centres and PRACE have to be reported in the online application forms**.

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 a GCS committee the projects will be approved for a period of one year and given their allocations.

Criteria for decision

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.

[1] Researchers from outside Germany may apply through PRACE (http://www.prace-ri.eu/call-announcements/).

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 http://www.gauss-centre.eu/contacts.