

Nordic HPC

Joint Nordic Supercomputer in Iceland

*Press Release and Announcement of Opening Event
Minister of Education, Science and Culture. Katrín Jakobsdóttir
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Signing of contract; release of procurement call; and press conference*

The national High Performance Computing (HPC) research infrastructures of Denmark, Norway and Sweden have decided to place a joint supercomputer in Iceland. Supercomputing is the foundation for much modern science and engineering and a host of technologies are on the horizon that we cannot hope to understand, develop, or utilize without Supercomputing. Regrettably Supercomputing needs lots of energy, which it so happens that Iceland has in abundance.

The project is a pilot initiative to understand the organizational and technical challenges of joint procurement, administration and operation of computational infrastructure for science. An important aspect of the project is also to explore the possibility to significantly improve the price-performance ratio of high-end compute power for researchers working with scientific calculation, simulation and modelling.

High-Performance Computing

High Performance Computing (HPC) enables advanced scientific calculation, simulation and modelling, which in turn, and to an increasing extent, is a precondition for much of the research and innovation that is so fundamental for any modern-day knowledge driven economy. "Providing access to HPC infrastructure is necessary for all countries with ambitions towards science and innovation", says Rene Belso from the Danish Center for Scientific Computing.

"Reality is that the cost for hosting and operating HPC installations in Scandinavian countries is comparable to the cost of the computing hardware itself" adds Jacko Koster from UNINETT Sigma. The Scandinavian countries, like many others, spend millions of Euros every year on electricity for HPC equipment, making operational costs a key factor in optimizing the cost-efficiency of HPC infrastructure.

Green energy

Added to this are, of course, the environmental consequences of large scale energy consumption, and the CO₂-footprint it entails. In Iceland, energy is produced at low cost from CO₂ neutral renewable hydro- and geo-thermal energy sources. Due to Iceland's geographical position, it is not feasible to transfer the

country's surplus of electricity to Europe. Hardware, however, can be moved. Also digital information can now easily be moved via the newly upgraded Scandinavian-Icelandic-USA fibre data-network infrastructure.

"It is therefore better to build up high energy consuming industry on the island itself. Placing a HPC facility on Iceland is therefore the better of two worlds, green energy is on site, and the nature of the installation means that researchers can get remote access to the facilities", says Ebba Þóra Hvannberg from the University of Iceland.

Cooperation, sharing and investment

In the long-term, joint large-scale procurements and energy-efficient placement of the equipment will be advantageous for the Scandinavian countries. It will introduce a substantial increase of value for money, when providing HPC infrastructure to its researchers, as well as the possibility to develop new competencies within shared operations of (remote) HPC installations, with possible implications for collaborative efforts also outside the Nordic countries. In addition, joint procurement may result in large scale infrastructure that facilitates truly computational grand challenge research.

The pilot project is a three-year, one million Euro *proof-of-concept*. The project has several short-term as well as long terms objectives. Concretely, the project aims to procure and operate a joint Nordic HPC installation. The resulting service must be cost efficient in the sense that it should deliver computational power at a cost that is lower than if such service would be established using existing national procedures. Other objectives are to acquire or increase experience with:

- Sharing computational resources across country boundaries by joint procurement
- Differences in the procedures for procurement in the national eInfrastructures
- Identifying suitable models for organization, governance, procurement, operations and usage, and funding for resources that are shared by multiple countries. This includes e.g., gaining experience in operations with shared responsibilities and understanding legal issues
- Using environmental aspects, such as renewable energy and energy-efficiency, as parameters in procurements
- Promoting cross-border cooperation in computational science.

The project is a collaboration between the Danish Center for Scientific Computing (DCSC), the Swedish National Infrastructure for Computing (SNIC), UNINETT Sigma and the University of Iceland. The compute facility will be hosted by Thor Data Center. Reykjavik.

Future

"If the pilot project is successful, successor projects may be defined in the coming years, e.g., for the procurement and sharing of resources that are larger or resources that are of a specialized nature for which there exists a clear but not very large need in several countries individually.", says Sverker Holmgren, director of SNIC.

Eventually, the aim is that national infrastructures for computational science in the participating countries can increase focus on delivering high-quality services and access to computational infrastructures for their users, whereas the more elementary aspects of the infrastructure (e.g., hosting of equipment) could be handed over to parties that can implement this in a more cost-efficient manner, without compromising quality of service

Contact Information:



The Danish Center for Scientific Computing (DCSC) is a national research infrastructure under the Danish Ministry of Science, Technology and Innovation providing Scientific or High Performance Computing as well as Distributed Computing infrastructure to Danish researchers who work with scientific calculations, simulations and modelling. Web: www.dcsc.dk; Mail: Rene Belso, belso@dcsc.dk



The Swedish National Infrastructure for Computing (SNIC) Swedish National Infrastructure for Computing (SNIC) is a national metacentre for high-performance computing under the Swedish Research Council. SNIC is responsible for providing a balanced and cost-efficient ecosystem of large-scale computing and data storage resources for Swedish research. SNIC also participates in several international initiatives and projects on different aspects of computing and data storage. Web: <http://www.snic.vr.se/>; Mail: Sverker Holmgren, Sverker.Holmgren@it.uu.se



UNINETT Sigma coordinates the Norwegian procurement and operation of national equipment for advanced scientific computing for the Research Council of Norway, in collaboration with four universities in Oslo, Bergen, Tromsø and Trondheim. Its responsibilities include ensuring long-term development of the infrastructure, including storage of scientific data. In addition, the company coordinates the Norwegian effort within grid infrastructure and represents Norway in international infrastructures and initiatives. Web: <http://www.uninett.no/sigma>; Mail: Jacko Koster, jacko.koster@uninett.no



The University of Iceland provides local representation in Iceland for the Nordic HPC members in regards to liaison with the Icelandic government and hosting providers in Iceland. This is done in close cooperation with DCSC, SNIC and UNINETT Sigma. The English term of "*Reiknistofnun Háskóla Íslands*" (RHÍ) is "Computing Services University of Iceland" and provides in-house computing service for the University of Iceland and is therefore the supervisor of the computer systems for the University of Iceland. Web: www.hi.is; Mail: Ebba Póra Hvannberg, ebba@hi.is



Thor Data Center is a new, Tier3, highly secure and modular datacenter in Hafnarfjörður, Iceland, that specializes in flexible and high-density hosting solutions. Taking advantage of Iceland's unique climate and natural resources, Thor Data Center is extremely energy efficient and completely emission free. Web: <http://www.thordc.com>; Mail: Árni Rafn Jónsson, arj@thordc.com



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The **Icelandic Ministry of Education, Science and Culture**, has a strategic policy interest in the project, and has contributed with coordination, liaison as well as funding. Web: <http://eng.menntamalaraduneyti.is/>; Mail: Hellen M. Gunnarsdóttir, Hellen.Gunnarsdottir@mrn.is