Pre-announcement of upcoming procurement, NWP18, at National Supercomputing Centre at Linköping University

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Abstract

Linköpings universitet hereby announces the opportunity to participate in an request for interest (RFI) in NWP18, an upcoming procurement of a new High Performance Computing Facility for National Supercomputer Centre at Linköping University, Sweden

Introduction

The National Supercomputer Centre at Linköpings universitet will during 2017 procure two High Performance Computing (HPC) Facilities to be installed in 2018, one for general purpose academic compute (AC2018) and one for numerical weather prediction (NWP18). The procurements will be carried out using negotiated procedure. Evaluations will be based on performance over lifetime cost for the systems and the performance will be determined using benchmarks. This document only pertains to the procurement of NWP18, details for AC2018 can be found in a separate document.

The intention with this pre-announcement is to allow vendors to familiarize themselves with the codes and relevant benchmark inputs, as well as to afford vendors the opportunity to respond to an RFI published along this pre-announcement. Vendors are encouraged to have a look and respond the RFI, but this is not mandatory to be part of the tendering.

About the Customer

Linköpings universitet (LiU) is a research-based university with excellence in education. LiU is a multi-faculty university where research and education are equally important. LiU has 27,000 undergraduate students, 3,900 staff and faculty members and a turnover of 3,300 MSEK.

LiU hosts one of the major academic High Performance Computing (HPC) centres in Sweden, National Supercomputer Centre (NSC, http://www.nsc.liu.se). NSC is a national supercomputing centre within the Swedish National Infrastructure for Computing (SNIC). Current staff is about 30 people. Since 1989, NSC has served the Swedish academic community as a provider of leading-edge super-computing resources and storage services to members of academic institutions throughout Sweden as well as to NSC partners SMHI (Swedish Meteorological and Hydrological Institute), MET Norway (Norwegian Meteorological Institute), and SAAB.

NSC owns and operates a number of large-scale compute and storage resources, and also offers in-depth support and help services to our users to enable the best possible performance and efficient use of the resources. NSC is and has been active in several European projects such as ENACTS, HPC4U, IS-ENES1, IS-ENES2, CLIPC, EGI and PRACE (1-IP through 5-IP). NSC also contributes directly to Swedish HPC research through its membership in the e-infrastructure organization SeRC (Swedish eScience Research Centre). NSC also has a collaboration on HPC services to the MaxIV laboratory in Lund.

Scope of the Upcoming Procurement

NWP18 is a procurement of a HPC resource that will be used for joint operational numerical weather prediction in Sweden, Norway, and Finland in MetCoOp (Meteorological Co-operation on Operational NWP (Numerical Weather Prediction)).

This procurement is funded by Swedish Meteorological and Hydrological Institute (SMHI) and Norwegian Meteorological Institute (MET Norway).

Purpose of the New Systems

For reasons of redundancy, the computing resource for weather prediction will consist of two separate system installations in two different computer rooms. Both installations will be used together with a computing resource at Finnish Meteorological Institute (FMI) as a joint computing resource for daily operational numerical weather prediction (NWP) for the common region of the three countries and serve as the main resource for the national weather forecasting services.

Furthermore, one of the two installations will have additional computing capacity for climate research simulations.

Contract

A preliminary estimate of the contract size is 35-40 MSEK including computer equipment, installation and five years of service and support.

Evaluation and Benchmarks

The evaluation of tenders will be based on the performance over lifetime cost for the system including facility costs such as power and cooling. Benchmark performance figures will be used to evaluate offered solutions.

NSC may modify the benchmarks until the time of the invitation to tender. Any modifications done to the benchmarks or required performance figures will be advertised to registered vendors, see section Access. The benchmark codes being considered are HARMONIE-AROME and NEMO. This list *may* be changed, but it is not very likely.

Evaluation

Tenders will be evaluated and ranked based on the outcome of two benchmark sessions.

1. The system is running multiple, identical copies of the HARMONIE-AROME benchmark.
2. The system is running multiple, identical copies of the NEMO benchmark.

Each session must run within a maximum allowed time and the output from the benchmark simulations must meet to correctness tests, provided with the benchmark codes.

The relative weighting of the two benchmark sessions will likely be in the range of

- HARMONIE-AROME, 70%-80%
- NEMO, 20%-30%

A full description of the evaluation formula that combines the performance results from the HARMONIE-AROME and NEMO sessions will be provided in the invitation to tender.

Vendor Specific Build Tools and Run-times

All vendor specific tools and libraries used to produce evaluation results *must* be included in the tender to be available to the users of the resource during its

supported life-time. This could for instance be vendor MPI implementations, compilers and their associated runtimes and math libraries.

Benchmarks

Benchmark codes are HARMONIE-AROME and NEMO. A good-practise guide for compilation and running these codes is provided in README files accompanying the respective benchmark archives. To facilitate competition on as equal terms as possible, a handful of directives, listed in the README file regarding building and running the benchmarks should be followed. These directives include for instance regulations around vendor code modifications and permissible optimization techniques.

File-IO in the benchmarks is kept low enough to isolate and measure CPU, memory and MPI/interconnect performance. The purpose of the benchmarks is to enable vendors to get acquainted with the codes and disseminate guides for building and executing the benchmarks correctly with good performance.

Other benchmarks, not used for tender evaluation purposes, may be included in the tender mainly aimed at testing components of the system. Performance numbers for multiple simultaneous executions of the benchmarks will be required for the evaluation. The number of simultaneous copies running of the benchmarks will be announced in the ITT. Node sharing of individual jobs will not be permitted in the evaluation.

Scientific Codes

The following codes and versions will be used:

HARMONIE-AROME - cycle 40(h1.1)

NEMO - version 3.3

Versions

To keep track of changes we will provide a version number for each release of the benchmarks. Modifications to the benchmark package will be communicated via e-mail to all vendors who has received access to the benchmark package as described in section Access below.

Access

To get access the benchmarks, vendors has to e-mail a signed license agreement to procurement officer. See section [Contact]{#contact}. The license agreement is available at **https://www.nsc.liu.se/about/procurement/NWP18** .

Modifications to the benchmark package will be communicated to all vendors who has signed the license agreement and received access to the benchmark package.

General Information Regarding the ITT

This procurement will use a negotiated procedure.

Schedule

Preliminary schedule for the procurement process of NWP18:

Date	Event
July 2017	Invitation to participate
August 2017	Invitation to tender
September 2017	Tender deadline
October 2017	Negotiations
November 2017	Award of Contract

Contact Information

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