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RE: HPC Scenarier, Høringssvar – Future scenarios for HPC in Denmark

Your mail 2013-03-18

http://www.deic.dk/en/HPC_scenario

Dear Steen Pedersen,

please find below our statement regarding future HPC scenarios for Denmark, as requested.

The IT University of Copenhagen, today and in the foreseeable future, only has a marginal interest in HPC facilities.

While the IT University focuses on IT as a service and integral part of literally all aspects of modern society and business, it does not in itself make intense use of HPC, unlike scientific disciplines as e.g. life sciences, physics, meteorology, a.o.

The IT University therefore is much more interested in some of the other fields of activities within DEIC, e.g national secure storage, combined with a user friendly interface ("a science dropbox"), data management, and would like to see a thorough investigation of the benefits of and demand for HPC investments, in balance with these.

While thus the IT University neither has strong interest in nor holds strong views on the HPC scenarios, we of course offer our participation in the discussion process, and supply some comments in what follows.



As pointed out by several participants of the meeting on 19 february 2013, an investment of the order of magnitude discussed warrants a thorough investigation of business case and model.

In our view, this should entail

- project economy
- the energy aspect - with a clear target of reaching fossil free operations within realistic timeframes
- comparisons between one (or several) dedicated danish HPC facility/ies and use of existing facilities, e.g. on regional (nordic) level
- detailed analysis of demand, usage and benefits

Making the case for a new and stronger danish HPC infrastructure towards the greater public, we should be prepared to answer the following questions:

- What advantages does a new danish HPC (in the capacity class of 2 *TFlops*) offer, in comparison to the existing 35 *TFlops* potentially available through the DEIC GARDAR investments?
- Who are the current and expected users and beneficiaries, in the wider science community in Denmark?

Like other commentators before us, we think that transparency, dissemination towards and benefit for the non-HPC-specialist science community are of the utmost importance.

Regarding the comparison of models within HPC, we see clear advantages in Scenario 2:

Given the size of the danish science community and the expected user group, collecting resources in a common national infrastructure - or participation in a larger scale initiative (e.g. within the nordic region) - clearly seems to be the favourable approach.



On neither business nor service levels will decentralized solutions (Tier 2/3) be able to compete with such an approach, and if Denmark would like to compete in an international context, it needs to do so with bundled and focused resources.

Interestingly, the preliminary economic analysis supplied supports this point, with a centralized offshore facility offering the lowest cost per core (DKK 0.219), a PUE of 1.4 in Denmark and 1.1 off-shore (see *Bilag 3 - Nærmere forklaring til økonomiscenarier*), and electricity costs of 1,70 DKK/kWh in Denmark and 0,80 DKK/kWh off-shore.

Thus, we would point at a *scenario '2.5'*, where Denmark participates in larger, regional initiatives rather than trying to compete on its own.

With the current *state of the art* in network quality, the physical location of a facility should be of no relevance to the users, nor to the organization responsible for administration, support, etc

Thus, location can and should be chosen entirely based on parameters like

- cost
- environmental footprint
- service models

Where quality of network or other infrastructure is still identified as non-satisfactory in the context of remote HPC, parts of the budgets set free by advantageous models chosen, should be used to improve and add what is seen as missing.

Looking at some detail aspects of the current proposal for a danish Tier 1 facility, and strongly supporting the views expressed in *Bilag 3 (Nærmere forklaring til økonomiscenarier)*, we point at the importance of energy cost and PUE.



The current outline seems to suggest an electricity consumption of 450 kW equivalent to costs of DKK 6M / year, and a PUE in the area of 1.5 – this would have to be critically compared with what is possible in today's HPC technology.

We remain interested and gladly contribute in the discussion and formulation of future strategies, for HPC and beyond,

Yours sincerely

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