



## Minutes from the Panel Discussion of the LinkSCEEM Internaional HPC Conference 2009

**Chair:** Thom Dunning (NCSA, University of Illinois - USA)

**Panel Members:** Constantia Alexandrou (CaSToRC, Cyprus Institute - Cyprus)  
Hafeez Hoorani (SESAME - Jordan)  
John Towns (NCSA, University of Illinois - USA)  
Pinhas Bar-Yoseph (Technion - Israel)  
Thomas Schulthess (CSCS - Switzerland)

### Panel Questions:

It was intended that the discussions of the panel centered around three main questions:

1. What is needed to advance computational science, engineering and technology in the Eastern Mediterranean region?
2. How can the Cyprus Institute and its Computation-based Science & Technology Research Center contribute to the advancement of computational science, engineering and technology in the region?
3. How can the region position itself to benefit from the major supercomputing initiatives underway in Europe, the U.S. and Japan?

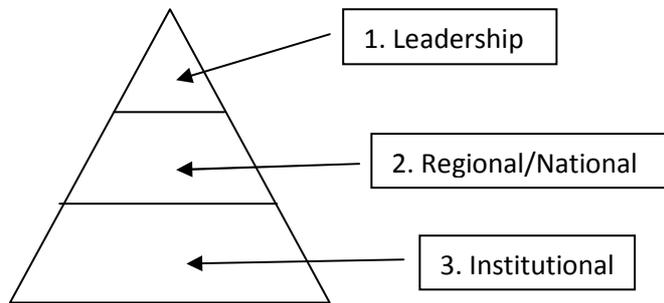
### Discussion:

T.Dunning opened the discussion by posing the above questions to the panel members. P.Bar-Yoseph briefly discussed his own experience in establishing an HPC Center in Israel where he acted as Scientific Director for the High Performance Computing Center (HPCU) at the National Inter University Computation Center (IUCC). He noted that while initial funding for the center existed, longer term funding was expected to be provided by the University but the University finances ultimately could not support this. The center had a good initial placing in the Top500 but by 2004 was out the list by 2 orders of magnitude. In that period the centers hardware was rapidly surpassed by technological developments.

A burning question for an emerging center is then how to improve the 'gain-to-pain' ratio? In addressing this question one really needs to address (some of) the ["Top 10 Challenges in Parallel Computing"](#) as written by Micheal Wrinn of Intel. Doing would allow a bridge to form between the center and the wider HPC ecosphere (mediated by organsiations such as PRACE) and reduce the impact of hardware aging.

H.Hoorani added that training for large scale computing facilities should not be focused solely on young students but should also address mid-career scientists in the region since they have the capacity to create research initiatives in these areas. This would also facilitate human networking

which would be an essential part of the proposed community. It would also address the fact that people in the region, in general, really lack the essential knowledge on how to use HPC.



T.Schulthess reiterated that computational simulation is indeed the third pillar of science. He stated that he believed that simulation requires a tiered HPC ecosystem:

An important *application* example of how this structure is used is that of [VASP](#). It

went from being an institutional to a national to a leadership application and **back** to a national application. What is important is not the computational power of the facilities but the simulation capabilities of those facilities. This requires a spectrum of capability computers and we need to ensure that applications move up and down the ecosystem and that the spectrum of capabilities is utilized. He would recommend that a factor of 5 should differentiate the tiers in this system (1.5PFlop/s -> 300 TFlop/s -> 60 TFlop/s). In 2011/2012 it is expected that the top tier would move to 20 PFlop/s which would mean an institutional level of 800 TFlop/s.

In direct response to the questions, T.Schulthess felt that a connected regional ecosystem must be built and it should be built in such a way that the connection path to larger systems is well defined. In response to the second question, he felt that it is reasonable to create a regional center. He believed the focus should be on enabling technologies and that computer science and mathematics should be nurtured in this environment leveraging some of the experiences of the [KAUST](#) center. He advised to act independently and to cherry-pick the focal areas. In terms of architecture he would recommend a commodity-based node architecture with GPU accelerators. To the third question he advised an indirect addressing of the issue, find first what your strengths are, build on them with the viewpoint that computational simulation is the goal. As a result opportunities worldwide will present themselves if the science is good enough.

C.Alexandrou agreed that a pyramid structure is indeed appropriate and that the access path to the top tier must exist. The partners that CaSToRC have are experienced and can make that path both possible and practical. She found that LinkSCEEM was a good learning process with the next step being to promote active collaboration in areas which are of particular interest across the region, such as climate change and digital cultural heritage. In particular, she noted that we need to assemble the resources to make this effort sustainable:

- need to be coupled to developments in Europe,
- need to promote appropriate educational programs,
- need to build on human capital.

J.Towns began by saying that while there is clearly a great deal of interest in the region there is a lack of organization and LinkSCEEM needs to be persistent. A solution will present itself by building a community and CaSToRC can act as a magnet for that community. Yes, there is a need to engage



the global community but there is a need for cohesion in the region first. The real question is: what are the strengths of the regional community that we can offer to the global community? In that sense the region should do something exciting that can give a focal point to a regional effort. At this point, T.Dunning opened the floor and invited questions and comments from the audience.

R.Ahmad of SESAME wondered whether there a computing advisory committee for the region should be developed to aid in building the tiered structure.

V.Jongeneel of the Cyprus Institute agreed that an ecosystem that flows both upwards and downwards is appropriate and that we should define our own strengths and needs rather than solely adopting those from the top tier.

Another person from the floor raised the point that many people are still not aware of the ongoing LinkSCEEM activities and that workshops would be very welcome. T.Dunning said that such things are part of the outreach activities of the project and efforts in this direction are ongoing.

N.Dalfes of the Istanbul Technical University commented that everyone will build their national effort but it was establishing the pyramid that was difficult. There is a need to empower people at the different scales. It is also a question of culture as well as ecosystem, need to cultivate people to experiment in their own area. Turkey's efforts involve workshops twice a year but this is not enough. The region needs a forum to share experiences and knowledge (such as power requirements and reliability of hardware). Thematic efforts are useful and high performance computing is the key element. V.Jongeneel commented that such ideas are exactly along the line of thinking for LinkSCEEM2. T.Schulthess advised to spend time on deciding what is needed in the region and develop an understanding of this so as not to repeat the mistake that others have made.

N.Nassif of the American University of Beirut commented that education is key to the questions posed. There is a need to establish sustainable curricula in these areas that are acceptable to academia. Such a thing is difficult in simulation science because it is so multidisciplinary. Because of this initiatives to properly establish educational programmes are needed.

R.Ludijten of IBM Research Lab Zurich advised to ensure that the human capital is developed to run the center in 10 to 20 years. People should be given the space to let the center define itself and find its own identity. C.Alexandrou commented that to enjoy the long term success of centers such as NCSA or Juelich input is needed from many people. To this T.Dunning added that we should also try to learn from the *mistakes* that these centers have made.

To conclude T.Dunning made a few final remarks again addressing the three questions posed. He said it is not a lack of academic problems that hinders advancement. Many exist and of these many have regional scope. If activities can be correlated across borders, that would lead to an unrivalled resource. He advised not to get computer envy but to focus on solving problems.

As a final remark he reiterated the need to build human capital. He advised that colleagues and students are the greatest asset you have. He also commented that education is indeed critical. In



particular he advised that it is now time to stop teaching serial programming, parallel programming is the future regardless of how large the machine and the time to focus on teaching that is now.