

October 21, 2013

Al Kellie, Director  
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National Center for Atmospheric Research (NCAR)  
Boulder, CO 80307-3000

Dear Al:

This is the customary summary letter to you after the latest meeting of the CISL High performance computing Advisory Panel (CHAP). Our meeting took place in the VisLab of the NCAR Mesa Laboratory on October 17, 2013. We were joined by Jim Hurrell, the new NCAR Director, for the planned presentations as well as for some of the reviews of computing requests. Sarah Ruth of the National Science Foundation (NSF) was able to participate in the entire meeting via telephone and ReadyTalk, as were four of the absentee CHAP members. We heard a presentation from Dave Hart on CISL operations, including a Yellowstone update, and a presentation by Rich Loft on tackling big data challenges. We also heard a presentation by Glen Romine on the Mesoscale Predictability Experiment (MPEX), a successful field campaign in which Yellowstone provided mesoscale forecasts, with data assimilation augmented by dropsonde data from the NCAR G5 aircraft.

The CHAP was very pleased to hear that persistent problems with the Mellanox InfiniBand cables were solved by a wholesale replacement of over 4,500 optical cables in the Yellowstone interconnect. The CHAP had earlier recommended that such action be taken to address the problems of poor performance and frequent job failures. The team that completed the cable replacements in only half the expected time is to be commended for their quick and effective action. Following the cable replacement, a number of operating system problems, which had not been able to be diagnosed earlier, were able to be isolated and solved. The end result has been much greater reliability, which had been especially lacking for large core jobs, and a moderate improvement in performance. To compensate for the prior problems, the Yellowstone system is expected to be configured with 18 additional nodes in order to fill out a full InfiniBand FDR14 fat tree. This is also very good news.

The CHAP noted that, with such a huge increase in now-stable computing and data manipulation and storage capacities, users are still on a learning curve with respect to understanding how best to use the facilities at the NCAR-Wyoming Supercomputing Center (NWSC). The CHAP encourages CISL to continue its proactive outreach efforts to support users in this regard, and to continue its evaluation of and experimentation with more effective ways to help users manage their workflow and data flow to optimize scientifically productive use of the resources. As users gain experience with Yellowstone and learn how to take full advantage of the computing resource, data management and analysis will become an even more critical issue requiring CISL's attention. Along those lines, the recent development by CISL of tools to allow time-slice files on GLADE to be rendered into time-series files (and vice versa) will go a long way to facilitate analysis using Caldera and Geyser prior to archiving only the most important results on the HPSS.

The archived results should be stored in the most economical fashion without compromising important detail; and CISL personnel are actively investigating various approaches to accomplish this goal and to initiate users into the optimal procedures.

A main topic of the meeting was the future augmentation of CHAP reviewing responsibilities to include very large climate-related requests for resources of the Climate Simulation Laboratory (CSL). CHAP would then be recommending allocations for roughly half of the 1.5 petaflop Yellowstone system. Al Kellie and Dave Hart provided a summary of the NSF plan to carry out the joint reviewing responsibilities within the context of the usual semi-annual one-day meeting. Many of the reasons for the merger of CSL with CHAP, as well as the structure and evolution of the CHAP beginning next year, had already been transmitted to CHAP members in earlier NSF emails from Anjali Bamzai and Sarah Ruth.

CHAP members seem to be receptive and even enthusiastic about their future enhanced responsibilities. There was some discussion of details to be clarified as the plan moves forward. For example, many CHAP members regard their advisory function to be very important as a means of communication between the University Community and CISL personnel, so the concept of being both an allocation and advisory panel was suggested. There were several offline comments during the morning break that the rotating Chair position should be for a period of more than one year in order to allow more continuity over, say, a period of two years. The possibility of a longer period than one year for CESM allocations was also mentioned.

The CHAP then began its usual task of reviewing University computing requests, for which there were 43 requests totaling some 131 million core-hours. This amount was more than twice the total available core-hours. A significant number of requests were either very large or lacked adequate justification and detail on planned computer runs and their costs, such that only partial allocations were made to them. A total of 59 million core-hours were recommended for approval to the CISL Director, in line with the total core-hours available for allocation at this particular meeting.

The CHAP expects CISL to reach out to requesting scientists and provide advice and feedback in order to help improve the overall quality of their future requests. This improvement will be important as the available resources continue to be oversubscribed, and it will provide the panel with appropriate justifications for their desired allocations.

The next meeting of the CHAP will be on May 8, 2014. The CHAP hopes to hear more about an optimally performing Yellowstone system at that time, along with improved workflow and analysis patterns of users. They look forward to the challenge of reviewing both University Community and Climate Simulation Laboratory requests in order to support many outstanding scientific projects targeting the Yellowstone system.

Respectfully submitted,  
Bert Semtner  
CHAP Chair

cc: Anke Kamrath, Rich Loft, Dave Hart, Jim Hurrell, Sarah Ruth, CHAP members