

## CENTER FOR ANALYSIS AND PREDICTION OF STORMS

The University of Oklahoma

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Professor Ken Kennedy  
Center for High Performance Software, MS 41  
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6100 Main Street  
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Dear Professor Kennedy,

Congratulations on your selection to be site visited in the 4th Science and Technology Centers competition! Having read carefully your proposal as a member of the NSF STC review panel, I am very familiar with your planned activities and find them to be exceptionally relevant, well defined, and vitally important to the practicability of the Grid concept. Indeed, they mesh nicely with the continuing research of my former STC, which has become somewhat of a "poster child" for the Grid.

As you know, the Center for Analysis and Prediction of Storms has, over the past decade, developed a numerical weather prediction system designed specifically for high-impact local weather, such as individual thunderstorms and their wintertime counterparts. The collaboration of your center with mine back in the early 1990s was invaluable as it evolved a framework for us to develop a portable, highly parallel application during a time when computational architectures not only were disparate, but also in a considerable state of flux. Today our code, and especially its parallel constructs, are the foundation for a new community model being developed jointly by the National Weather Service, the FAA, and the US military.

Our work, however, is not finished. The numerical prediction of local weather is an extremely dynamic problem that requires both distributed computing and distributed data acquisition. Specifically, using a series of nested grids, each having successively finer mesh spacing, our model is able to capture the details of local, high-impact weather while at the same time representing the larger-scale environment. With automated nesting, in which new grids -- computed on physically distributed machines -- are initiated over regions of developing weather and removed over regions where active weather is dissipating, the computation becomes substantially more dynamic because the model configuration changes with time, in response to the weather.

### CAPS

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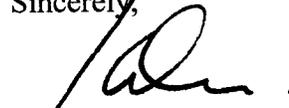
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Further, as new storms develop in the real atmosphere, the bandwidth of the associated radar data that feed the model change dynamically in time, thus requiring a commensurate response in networking on the national scale to ensure that the computation can be completed on time. This concept of dynamic networking linked to dynamic *distributed* computation and data acquisition is the essence of the Grid, and is the reason why CAPS wishes to develop a Grid implementation of its prediction system.

Like your center, our NSF base funding ended in early 2000. However, we have maintained a healthy source of other funding, and only 3 months ago signed a 5-year, \$8.1 million contract with a private company, half of which is for basic research. We therefore have the means to pursue a vigorous collaboration with your new center to move our forecast system to the Grid, and are ready to commit significant resources to such an effort.

You have my warm wishes for a successful site visit, and my hopes for a bright future of interaction.

Sincerely,



Kelvin K. Droegemeier  
Presidential Professor of  
Meteorology and Director of CAPS