

## Understanding and Achieving Good Performance on Teragrid Resources: From Simple Performance Monitoring to Sophisticated Performance Models

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With the massive concurrencies of the petascale era understanding and achieving good performance with scientific applications on a High End Computing resources is becoming increasingly difficult. Issues affecting performance can range from the relatively simple, such as load imbalance, all the way to task-layout optimization. By using our simple performance monitoring framework, IPM, we show how it is possible to gain a basic understanding of the performance issues affecting the scalability of an application. To understand more complex issues and to achieve greater performance overall, more sophisticated performance modeling approaches maybe required. Here we describe our work using the PMaC performance modeling framework to improve the performance and scalability of WRF and SPECFEM3D, which were finalists for Gordon Bell prize at SC07 and SC08 respectively. The Teragrid machines, Abe, Datastar, Kraken, Lonestar and Ranger were all used in this work. If time permits, we will discuss future research directions for both IPM and the PMaC Performance Modeling framework.

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