Parallel performance tools offer the program developer insights into the execution behavior of an application and are a valuable component in the cycle of application development and deployment. However, most tools do not work well with large-scale parallel applications where the performance data generated comes from thousands of processes. Not only can the data be difficult to manage and the analysis complex, but existing performance display tools are mostly restricted to two dimensions and lack the customization and interaction to support full data investigation. In addition, it is increasingly important that performance tools be able to function online, making it possible to control and adapt long-running applications based on performance feedback. Again, large-scale parallelism complicates the online access and management of performance data, and it may be desirable to integrate performance analysis and visualization in existing computational steering infrastructures.

The coupling of advanced three-dimensional visualization with large-scale, online performance analysis could enhance application performance evaluation. The challenge is to develop a framework where the following work, such as access to the performance data and graphics rendering, is supported by the underlying system, leaving tool developers to focus on the high level design of the analysis and visualization capabilities.

The TAU parallel performance system is an integrated toolkit for performance instrumentation, measurement, analysis, and visualization of large-scale parallel applications. TAU provides robust support for multi-threaded, message passing, or mixed-mode programs written in C, C++, Fortran 77/90, and OpenMP. Multiple instrumentation options are available, including automatic source instrumentation. The TAU measurement system supports parallel profiling and tracing. It has been ported to all ASCII platforms and is used extensively in ASCI code development projects. TAU is being integrated in the Uintah Computational Framework (UCF) and will be applied to evaluation and optimization of UCF and C-SAFE simulations.

The performance data used by TAU is in a file system format. TAU provides a parallel file system implementation for the parallel performance profile dataset. The data is written to a file for each process and is split by thread. Each file is a single profile dataset, and each sample is a single profile sample.

TAU parallel performance system is a tool that allows for the collection and analysis of performance data. It is designed to work with large-scale parallel applications and provides robust support for multi-threaded, message passing, or mixed-mode programs written in C, C++, Fortran 77/90, and OpenMP. Multiple instrumentation options are available, including automatic source instrumentation. The TAU measurement system supports parallel profiling and tracing. It has been ported to all ASCII platforms and is used extensively in ASCI code development projects. TAU is being integrated in the Uintah Computational Framework (UCF) and will be applied to evaluation and optimization of UCF and C-SAFE simulations.

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