Towards Insight in Performance Analysis

Abstract:

With the increased complexity and scale of parallel systems, performance analysis is becoming a key component in optimizing the productivity of programmers and the efficiency of programs. In the same way that to fly blind in the midst planes need instruments, program developers will need performance tools that provide real insight into the behavior of their programs and machines.

The dominant practice in performance analysis is to instrument and capture a lot of data, but then report first order statistics in typical profiles. We are seeing a period where the analysis power and intelligence injected into the performance analysis tools will dramatically grow in order to deliver real insight to the program developers.

We will present the BSC tools, an extremely flexible and powerful performance analysis environment developed with such vision, supporting extremely detailed analyses, integrating modeling capabilities and quantifying expectations of potential improvements before actually implementing suggested code refactoring or system changes. Two basic tools in the infrastructure are Paraver, a trace visualizer, and Dimemas an MPI replay simulator. We will also describe how techniques from other fields such as signal processing, data mining or life sciences are used within the environment to gain insight in the applications and systems behavior, in what we call Performance Analytics.