

Cray User Group Summit 2003

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The format of this year's CUG meeting deviated from that of previous years since SGI have decided to hold a separate user group meeting from 2003 onwards. This gave Cray the chance to give the new X1 machine centre stage for a whole week of presentations and discussions at the Hyatt on Capitol Square, Columbus. Another notable difference from last year's event was the enthusiasm and confidence that accompanied the meeting, with both Cray employees and CUG site representatives showing approval at the early performance of the X1. The enthusiasm is justified since the X1, Cray's first high-profile release since the T3E, has created \$100million of income for Cray in just one quarter-year, with more large systems on the horizon. In fact, early in the week, Cray's corporate updates revealed that the next year's product targets have already been reached.

The US DoE's newly installed system at Oak Ridge National Laboratory was of particular interest, since the existing 32 processor system will undergo a series of upgrades, eventually making a 40 Teraflop system that will rival the Earth Simulator for the No.1 slot in the Top 500. Cray are also benefiting from the income and publicity gained from the ASCI Red-Storm project - a \$90million project which will create a 40TFlop/s AMD-chipped system for the US DoE. Cray's established systems such as the MTA and the SV1 were also discussed. MTA technology will form a crucial part of the upcoming Black Widow project.

Representatives from the SVE group at Manchester gave three presentations at the conference. Mike Pettipher discussed CSAR's innovative resource management system and procedures. Jon Gibson's work on finite element analysis codes on the Cray MTA was also presented by Mike Pettipher and Adrian Tate talked about SVE's new project to tune parallel numerical library routines for the X1 scientific library (see page 21 of this issue). All of the SVE talks were enthusiastically received by conference attendees, with many people personally expressing an interest, or posing questions throughout the conference.

The theme of the conference was 'Flight to Insight' which was given some context when Janet Bednarek gave an

account of the history of aviation, to which Ohio has a very important role being the home of the Wright brothers. Orville Wright even made an appearance at the CUG night out. Another keynote talk was given by Jeffrey Harrow of the Harrow Group who gave an entertaining and atypical account of the development of technology. Paul Muzio and Richard Walsh gave a total life cycle cost comparison of a Cray X1 and commodity clusters. For a given application, with many factors taken into account, such as purchase cost, necessary support and likely sustained performance, the X1 came out slightly better than a Pentium 4 system.

Representatives of Los Alamos National Laboratory gave a half day tutorial on performance modelling of large applications. These models attempt to give, in advance, some understanding of what the performance of important applications will be on certain architectures. The model is achieved by considering a range of factors and by examining the performance of micro-kernels extracted from the application. Later in the week, these techniques were applied to the Earth Simulator.

Of the technical presentations, there were many important talks on features of X1 programming and optimisation such as an overview of CrayPat - Cray's optimisation tool, a tutorial on X1 optimisation techniques that advocated the use of SHMEM and Co-array Fortran over MPI, and a preview of what to expect in Fortran 2000, which detailed some interesting features such as the lack of constraints on allocatable array and derived type usage, and advanced C-Fortran interoperability. A number of talks gave overviews of the X1 technology's initial performance and reliability.

The most important feature of events such as CUG is to meet and exchange ideas with recognized experts in the field. The CUG social focus and the excellent facilities at the conference centre allowed this practice to flourish. The next CUG will be held at Knoxville, Tennessee, home to Oak Ridge National Laboratory and the new X1. Despite the imminent retirement of Turing, CSAR as part of the SVE group, will continue to play an active role in Cray User group meetings, not least since by the time of the next CUG there will be much to show in the X1 scientific library tuning project.