Cray XMT BOF

At SuperComputing '09

Date: 10:30-12:30 Tuesday
November 17th 2009

Where: Double Tree Hotel
Roosevelt Conference Room
1000 NE Multnomah Street
(4 blocks East of convention center on NE Hollady St.)

What: Four 25-minute presentations followed by question-answer time.

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XMT Status and Roadmap

Shoaib Mufti, Jim Harrell, Cray Inc.

We will provide status update for the XMT program, including ongoing software enhancements and support efforts, the hardware roadmap, and the proposed features of future XMT software releases.

Characterizing and Analyzing Massive Spatio-Temporal Graphs

David A. Bader (speaker), David Ediger, Karl Jiang, and Jason Riedy, Georgia Tech.

The explosion of real-world graph data poses a substantial challenge: How can we analyze constantly changing graphs with billions of vertices? Our approach leverages the Cray XMT's fine-grained parallelism and flat memory model to scale to massive graphs. On PNNL's Cray XMT, our static graph characterization package GraphCT summarizes such massive graphs, and our ongoing STINGER streaming work updates clustering coefficients on massive graphs at a rate of tens of thousands updates per second.

The MultiThreaded Graph Library

Greg Mackey, Sandia National Laboratory

The MultiThreaded Graph Library (MTGL) is a C++ library of graph algorithms inspired by the Boost Graph Library, MTGL provides abstractions for hiding machine-specific programming models of multithreaded platforms. We will describe a breadth-first search example in which it is possible to introduce several of these abstractions without introducing any performance overhead. We will also discuss the performance and programming implications of traversals through a graph that allow general function calls upon each vertex visit, and combinations of these abstractions to solve more complex problems such as maximum flow and approximate subgraph isomorphism. We will conclude by discussing the use of the MTGL in a persistent, open-source graph and linear algebra database application called MEGRAPHS that is being developed at Sandia.

Evaluating XMT Performance using the Cycles/Element Approach

Shahid Bokhari, Ohio State

XMT Performance on a set of codes using Cycles/Element analysis will be discussed. This approach allows us to evaluate how well a code implementation matches the expected asymptotic behavior, and is well-suited to the evaluation of massively multithreaded systems.