Runtime System and Out-of-Core Cholesky Factorization on the Intel Xeon Phi System

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Overview – Runtime System

Basic Specifications:
- Beacon: 157.3 TFLOPS (peak)
- 672 processors and 42 active nodes in total
- Four 1.054 GHz Intel Xeon Phi co-processors, each having 60 cores
- Maximum Ideal Performance from co-processors: 4040 GFLOPS

Programming Environments:
- PLASMA – dense algebra algorithms
- QUARK – multithreading and task management
- Intel MKL Library – optimized math library for comparison with PLASMA

Purpose:
- Modifying the current OOC driver to implement QUARK threading and management in order to accomplish potential optimization

All performance testing will rely on Native Mode Execution
Overview – Out of Core

[Title]

[What is OOC algorithm]

[How does it differ from standard Cholesky]

What is the Task-Based DAG
Proposed Methodology

Runtime Systems

- Understanding each programming environment
  - Matrix Multiplication & DGEMM (QUARK, PLASMA, Intel MKL)
  - Hello World Multithreading (QUARK, Intel MKL)
  - Performance Testing in seconds & GFLOPS (PLASMA, Intel MKL)
- Interacting with Beacon
  - Bash Scripting Interactive Jobs, Native Mode Execution
- End Goal
  - Optimizing the current runtime system using the current research Out of Core (OOC) Driver
Out of Core Cholesky

[What have you been reading?]

[Any test code?]

Task-Based DAG
Betro, Vincent. *Beacon Quickstart Guide at AACE/NICS*


Kurzak, Jakub. *PLASMA/QUARK and DPLASMA/PaRSEC tutorial: ICL UT Innovative Computing Laboratory.*