DPLASMA is the leading implementation of a dense linear algebra package for distributed heterogeneous systems. It is designed to deliver sustained performance for distributed systems where each node features multiple sockets of multicore processors, and if available, accelerators like GPUs or Intel Xeon Phi. DPLASMA achieves this objective through the state of the art PaRSEC runtime, porting the Parallel Linear Algebra Software for Multicore Architectures (PLASMA) algorithms to the distributed memory realm.

**FUNCTIONALITY**

- Linear Systems of Equations
- Least Squares
- Symmetric Eigenvalue Problem
- Level 3 Tile BLAS
  - Cholesky, LU (inc. pivoting, PP), LDL (prototype)
- QR & LQ
- Reduction to Band (prototype)
- GEMM, TRSM, TRMM, HEMM/SYMM, HERK/SYRK, HER2K/SYR2K

**FEATURES**

- Covering four precisions: double real, double complex, single real, single complex (D, Z, S, C)
- Providing ScalAPACK-compatible interface for matrices in F77 column-major layout
- Supporting: Linux, Windows, Mac OS X, UN*X (depends on MPI, hwloc)

**USER DEFINED DATA PLACEMENT**

In addition to traditional ScalAPACK data distribution, DPLASMA provides interfaces for users to expose arbitrary tile distributions, and the algorithms transparently operate on local data, or introduce implicit communications to resolve dependencies, removing the burden of initial data re-shuffle, and providing to the user a novel approach to address load balance.

**FUTURE PLANS**

- Fine grain Composition of Operations
- Two-sided Factorizations
- Distributed Sparse Solver
- More GPU kernels integration
- LU+RBT

**SOLVING Linear Least Square Problem (DGEQRF)**

60-node, 480-core, 2.27GHz Intel Xeon Nehalem, IB 20G System

**THEORETICAL PEAK OF 4358.4 GFLOP/S**

**THEORETICAL PEAK OF 4358.4 GFLOP/S**

**ENERGY EFFICIENCY**

- Solving Linear Least Square Problem (DGEQRF) System G Virginia Tech, 32-node, 256-core, Intel Xeon 2.8GHz, IB20G

**SOLVING Hermitian Positive-Definite System (SPOTRF)**

12-node, 96-core, 2.27GHz Intel Xeon Nehalem, IB 20G System w/ 12-Tesla C2070 GPU

**PRACTICAL PEAK OF 3258.1 GFLOP/S**

**PRACTICAL PEAK OF 3258.1 GFLOP/S**

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http://icl.utk.edu/parsec