PROJECT GOALS

• Provide performance bounds in locality space using real world computational kernels
• Allow scaling of input data size and time to run according to the system capability
• Verify the results using standard error analysis
• Allow vendors and users to provide optimized code for superior performance
• Make the benchmark information continuously available to the public in order to disseminate performance tuning knowledge and record technological progress over time
• Ensure reproducibility of the results by detailed reporting of all aspects of benchmark runs

FEATURE HIGHLIGHTS OF HPCC 1.4.2 RELEASED OCTOBER 2012

• Increased sizes of scratch vectors for local FFT tests to account for runs on systems with large main memory (reported by IBM, SGI and Intel).
• Reduced vector size for local FFT tests due to larger scratch space needed.
• Added a type cast to prevent overflow of a 32-bit integer vector size in FFT data generation routine (reported by IBM).
• Fixed variable types to handle array sizes that overflow 32-bit integers in RandomAccess (reported by IBM and SGI).
• Changed time-bound code to be used by default in Global RandomAccess and allowed for it to be switched off with a compile time flag if necessary.
• Code cleanup to allow compilation without warnings of RandomAccess test.
• Changed communication code in PTRANS to avoid large message sizes that caused problems in some MPI implementations.
• Updated documentation in README.txt and README.html files.

LOCALITY SPACE OF MEMORY ACCESS IN APPLICATIONS

HPCC RESULTS’ PAGE

SUMMARY OF HPCC AWARDS

CLASS 1: Best Performance

• Best in G-HPL, EP-STREAM-Triad per system, G-RandomAccess, G-FFT
• There will be 4 winners (one in each category)

CLASS 2: Most Productivity

• One or more winners
• Judged by a panel at SC12 BOF
• Stresses elegance and performance
• Implementations in various (existing and new) languages are encouraged
• Submissions may include up to two kernels not present in HPCC
• Submission consists of: code, its description, performance numbers, and a presentation at the BOF
HPCC AWARDS CLASS 1: PERFORMANCE

HPCC BENCHMARKS

**HPL**
This is the widely used implementation of the Linpack TPP benchmark. It measures the sustained floating point rate of execution for solving a linear system of equations.

**STREAM**
A simple benchmark test that measures sustainable memory bandwidth (in GB/s) and the corresponding computation rate for four vector kernel codes.

**RandomAccess**
Measures the rate of integer updates to random locations in large global memory array.

**PTRANS**
Implements parallel matrix transpose that exercises a large volume communication pattern whereby pairs of processes communicate with each other simultaneously.

**FFT**
Calculates a Discrete Fourier Transform (DFT) of very large one-dimensional complex data vector.

**b_eff**
Effective bandwidth benchmark is a set of MPI tests that measure the latency and bandwidth of a number of simultaneous communication patterns.

**DGEMMM**
Measures the floating point rate of execution of double precision real matrix-matrix multiplication.

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**G-STREAM-Triad**
- IBM Blue Gene/L LIVERMORE 2005
- Cray XT3 Quad-core OAK RIDGE 2006
- Cray XT5 Hex-core LIVERMORE 2007
- Fujitsu SPARC64 VIIIfx JAMSTEC 2008
- Fujitsu SPARC64 VIIIfx JAMSTEC 2009
- Fujitsu SPARC64 VIIIfx JAMSTEC 2010
- Fujitsu SPARC64 VIIIfx JAMSTEC 2011

**G-HPL**
- IBM Blue Gene/L LIVERMORE 2005
- Fujitsu SPARC64 VIIIfx JAMSTEC 2006
- Fujitsu SPARC64 VIIIfx JAMSTEC 2007
- IBM Blue Gene/P LIVERMORE 2008
- Cray XT5 Hex-core OAK RIDGE 2009
- Cray XT5 Hex-core OAK RIDGE 2010
- Fujitsu SPARC64 VIIIfx JAMSTEC 2011

**G-RandomAccess**
- IBM Blue Gene/L LIVERMORE 2005
- Cray XT3 Quad-core SANDIA 2006
- IBM Blue Gene/P LIVERMORE 2007
- Fujitsu SPARC64 VIIIfx JAMSTEC 2008
- Fujitsu SPARC64 VIIIfx JAMSTEC 2009
- Fujitsu SPARC64 VIIIfx JAMSTEC 2010
- Fujitsu SPARC64 VIIIfx JAMSTEC 2011

**G-FFT**
- Fujitsu SPARC64 VIIIfx JAMSTEC 2005
- IBM Blue Gene/L LIVERMORE 2006
- Fujitsu SPARC64 VIIIfx JAMSTEC 2007
- Fujitsu SPARC64 VIIIfx JAMSTEC 2008
- Fujitsu SPARC64 VIIIfx JAMSTEC 2009
- Fujitsu SPARC64 VIIIfx JAMSTEC 2010
- Fujitsu SPARC64 VIIIfx JAMSTEC 2011