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#####
This is the DARPA/DOE HPC Challenge Benchmark version 1.4.2 October 2012
Produced by Jack Dongarra and Piotr Luszczek
Innovative Computing Laboratory
University of Tennessee Knoxville and Oak Ridge National Laboratory
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See the source files for authors of specific codes.
Compiled on Feb 6 2016 at 20:00:14
Current time (1510934849) is Fri Nov 17 18:07:29 2017
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```
Hostname: 'halopad'
```

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=====
HPLinpack 2.0 -- High-Performance Linpack benchmark -- September 10, 2008
Written by A. Petitet and R. Clint Whaley, Innovative Computing Laboratory, UTK
Modified by Piotr Luszczek, Innovative Computing Laboratory, UTK
Modified by Julien Langou, University of Colorado Denver
=====
```

An explanation of the input/output parameters follows:

```
T/V      : Wall time / encoded variant.
N        : The order of the coefficient matrix A.
NB       : The partitioning blocking factor.
P        : The number of process rows.
Q        : The number of process columns.
Time     : Time in seconds to solve the linear system.
Gflops   : Rate of execution for solving the linear system.
```

The following parameter values will be used:

```
N       : 2560
NB      : 80
PMAP    : Column-major process mapping
P       : 1
Q       : 1
PFACT   : Right
NBMIN   : 4
NDIV    : 2
RFACT   : Crout
BCAST   : 1ringM
DEPTH   : 1
SWAP    : Mix (threshold = 64)
L1      : transposed form
U       : transposed form
EQUIL   : yes
ALIGN   : 8 double precision words
```

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- The matrix A is randomly generated for each test.
- The following scaled residual check will be computed:
  ||Ax-b||_oo / ( eps * ( || x ||_oo * || A ||_oo + || b ||_oo ) * N )
- The relative machine precision (eps) is taken to be 1.110223e-16
- Computational tests pass if scaled residuals are less than 16.0
```

Begin of MPIRandomAccess section.

```
Running on 1 processors (PowerofTwo)
Total Main table size = 2^22 = 4194304 words
PE Main table size = 2^22 = 4194304 words/PE
Default number of updates (RECOMMENDED) = 16777216
Number of updates EXECUTED = 16777216 (for a TIME BOUND of 60.00 secs)
```

CPU time used = 2.684000 seconds
 Real time used = 4.944756 seconds
 0.003392931 Billion(10^9) Updates per second [GUP/s]
 0.003392931 Billion(10^9) Updates/PE per second [GUP/s]
 Verification: CPU time used = 0.332000 seconds
 Verification: Real time used = 0.330461 seconds
 Found 0 errors in 4194304 locations (passed).
 Current time (1510934854) is Fri Nov 17 18:07:34 2017

End of MPIRandomAccess section.
 Begin of StarRandomAccess section.
 Main table size = 2^{22} = 4194304 words
 Number of updates = 16777216
 CPU time used = 0.292000 seconds
 Real time used = 0.291229 seconds
 0.057608327 Billion(10^9) Updates per second [GUP/s]
 Found 0 errors in 4194304 locations (passed).
 Node(s) with error 0
 Minimum GUP/s 0.057608
 Average GUP/s 0.057608
 Maximum GUP/s 0.057608
 Current time (1510934855) is Fri Nov 17 18:07:35 2017

End of StarRandomAccess section.
 Begin of SingleRandomAccess section.
 Main table size = 2^{22} = 4194304 words
 Number of updates = 16777216
 CPU time used = 0.288000 seconds
 Real time used = 0.289503 seconds
 0.057951815 Billion(10^9) Updates per second [GUP/s]
 Found 0 errors in 4194304 locations (passed).
 Node(s) with error 0
 Node selected 0
 Single GUP/s 0.057952
 Current time (1510934856) is Fri Nov 17 18:07:36 2017

End of SingleRandomAccess section.
 Begin of MPIRandomAccess_LCG section.
 Running on 1 processors (PowerofTwo)
 Total Main table size = 2^{22} = 4194304 words
 PE Main table size = 2^{22} = 4194304 words/PE
 Default number of updates (RECOMMENDED) = 16777216
 Number of updates EXECUTED = 16777216 (for a TIME BOUND of 60.00 secs)
 CPU time used = 2.836000 seconds
 Real time used = 4.984834 seconds
 0.003365652 Billion(10^9) Updates per second [GUP/s]
 0.003365652 Billion(10^9) Updates/PE per second [GUP/s]
 Verification: CPU time used = 0.336000 seconds
 Verification: Real time used = 0.336566 seconds
 Found 0 errors in 4194304 locations (passed).
 Current time (1510934861) is Fri Nov 17 18:07:41 2017

End of MPIRandomAccess_LCG section.
 Begin of StarRandomAccess_LCG section.
 Main table size = 2^{22} = 4194304 words
 Number of updates = 16777216
 CPU time used = 0.280000 seconds
 Real time used = 0.283592 seconds
 0.059159697 Billion(10^9) Updates per second [GUP/s]
 Found 0 errors in 4194304 locations (passed).
 Node(s) with error 0

Minimum GUP/s 0.059160
 Average GUP/s 0.059160
 Maximum GUP/s 0.059160
 Current time (1510934862) is Fri Nov 17 18:07:42 2017

End of StarRandomAccess_LCG section.
 Begin of SingleRandomAccess_LCG section.
 Main table size = $2^{22} = 4194304$ words
 Number of updates = 16777216
 CPU time used = 0.284000 seconds
 Real time used = 0.281807 seconds
 0.059534380 Billion(10^9) Updates per second [GUP/s]
 Found 0 errors in 4194304 locations (passed).
 Node(s) with error 0
 Node selected 0
 Single GUP/s 0.059534
 Current time (1510934862) is Fri Nov 17 18:07:42 2017

End of SingleRandomAccess_LCG section.
 Begin of PTRANS section.

M: 1280
 N: 1280
 MB: 80
 NB: 80
 P: 1
 Q: 1

	M	N	MB	NB	P	Q	TIME	CHECK	GB/s	RESID
WALL	1280	1280	80	80	1	1	0.01	PASSED	1.064	0.00
CPU	1280	1280	80	80	1	1	0.01	PASSED	1.092	0.00
WALL	1280	1280	80	80	1	1	0.01	PASSED	1.062	0.00
CPU	1280	1280	80	80	1	1	0.02	PASSED	0.819	0.00
WALL	1280	1280	80	80	1	1	0.01	PASSED	1.030	0.00
CPU	1280	1280	80	80	1	1	0.01	PASSED	1.092	0.00
WALL	1280	1280	80	80	1	1	0.01	PASSED	1.030	0.00
CPU	1280	1280	80	80	1	1	0.01	PASSED	1.092	0.00
WALL	1280	1280	80	80	1	1	0.01	PASSED	1.030	0.00
CPU	1280	1280	80	80	1	1	0.01	PASSED	1.092	0.00

Finished 5 tests, with the following results:
 5 tests completed and passed residual checks.
 0 tests completed and failed residual checks.
 0 tests skipped because of illegal input values.

END OF TESTS.
 Current time (1510934863) is Fri Nov 17 18:07:43 2017

End of PTRANS section.
 Begin of StarDGEMM section.
 Scaled residual: 0.0146175
 Node(s) with error 0
 Minimum Gflop/s 1.385797
 Average Gflop/s 1.385797
 Maximum Gflop/s 1.385797
 Current time (1510934868) is Fri Nov 17 18:07:48 2017

End of StarDGEMM section.
 Begin of SingleDGEMM section.
 Scaled residual: 0.0166492
 Node(s) with error 0
 Node selected 0

Single DGEMM Gflop/s 1.376866
 Current time (1510934873) is Fri Nov 17 18:07:53 2017

End of SingleDGEMM section.
 Begin of StarSTREAM section.

 This system uses 8 bytes per DOUBLE PRECISION word.

Array size = 2184533, Offset = 0
 Total memory required = 0.0488 GiB.
 Each test is run 10 times, but only
 the *best* time for each is used.

 Your clock granularity/precision appears to be 1 microseconds.
 Each test below will take on the order of 3641 microseconds.
 (= 3641 clock ticks)
 Increase the size of the arrays if this shows that
 you are not getting at least 20 clock ticks per test.

WARNING -- The above is only a rough guideline.
 For best results, please be sure you know the
 precision of your system timer.

Function	Rate (GB/s)	Avg time	Min time	Max time
Copy:	6.1484	0.0059	0.0057	0.0063
Scale:	6.0004	0.0059	0.0058	0.0062
Add:	6.3829	0.0084	0.0082	0.0089
Triad:	6.3843	0.0084	0.0082	0.0090

Results Comparison:

Expected : 2519423615566406144.000000 503884723113281280.000000
 671846297484375040.000000

Observed : 2519423615622480384.000000 503884723094127232.000000
 671846297499976832.000000

Solution Validates

 Node(s) with error 0

Minimum Copy GB/s 6.148361
 Average Copy GB/s 6.148361
 Maximum Copy GB/s 6.148361
 Minimum Scale GB/s 6.000390
 Average Scale GB/s 6.000390
 Maximum Scale GB/s 6.000390
 Minimum Add GB/s 6.382860
 Average Add GB/s 6.382860
 Maximum Add GB/s 6.382860
 Minimum Triad GB/s 6.384342
 Average Triad GB/s 6.384342
 Maximum Triad GB/s 6.384342

Current time (1510934873) is Fri Nov 17 18:07:53 2017

End of StarSTREAM section.
 Begin of SingleSTREAM section.

 This system uses 8 bytes per DOUBLE PRECISION word.

Array size = 2184533, Offset = 0
 Total memory required = 0.0488 GiB.
 Each test is run 10 times, but only
 the *best* time for each is used.

Your clock granularity/precision appears to be 1 microseconds.
 Each test below will take on the order of 3566 microseconds.
 (= 3566 clock ticks)

Increase the size of the arrays if this shows that
 you are not getting at least 20 clock ticks per test.

 WARNING -- The above is only a rough guideline.
 For best results, please be sure you know the
 precision of your system timer.

Function	Rate (GB/s)	Avg time	Min time	Max time
Copy:	6.1484	0.0069	0.0057	0.0065
Scale:	6.0004	0.0068	0.0058	0.0063
Add:	6.6466	0.0089	0.0079	0.0089
Triad:	6.6190	0.0091	0.0079	0.0090

 Results Comparison:

Expected : 2519423615566406144.000000 503884723113281280.000000
 671846297484375040.000000

Observed : 2519423615622480384.000000 503884723094127232.000000
 671846297499976832.000000

Solution Validates

Node(s) with error 0

Node selected 0

Single STREAM Copy GB/s 6.148361

Single STREAM Scale GB/s 6.000390

Single STREAM Add GB/s 6.646586

Single STREAM Triad GB/s 6.618978

Current time (1510934873) is Fri Nov 17 18:07:53 2017

End of SingleSTREAM section.

Begin of MPIFFT section.

Number of nodes: 1

Vector size: 524288

Generation time: 0.025

Tuning: 0.030

Computing: 0.055

Inverse FFT: 0.054

max(|x-x0|): 1.459e-15

Gflop/s: 0.913

Current time (1510934874) is Fri Nov 17 18:07:54 2017

End of MPIFFT section.

Begin of StarFFT section.

Vector size: 1048576

Generation time: 0.047

Tuning: 0.000

Computing: 0.053

Inverse FFT: 0.058

max(|x-x0|): 1.687e-15

Node(s) with error 0

Minimum Gflop/s 1.997178

Average Gflop/s 1.997178

Maximum Gflop/s 1.997178

Current time (1510934874) is Fri Nov 17 18:07:54 2017

End of StarFFT section.

Begin of SingleFFT section.

Vector size: 1048576

Generation time: 0.050

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Tuning:      0.000
Computing:   0.054
Inverse FFT: 0.059
max(|x-x0|): 1.687e-15
Node(s) with error 0
Node selected 0
Single FFT Gflop/s 1.942308
Current time (1510934874) is Fri Nov 17 18:07:54 2017

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End of SingleFFT section.
Begin of LatencyBandwidth section.
Current time (1510934874) is Fri Nov 17 18:07:54 2017

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End of LatencyBandwidth section.
Begin of HPL section.

```

```

=====
HPLinpack 2.0 -- High-Performance Linpack benchmark -- September 10, 2008
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PFACT   : Right
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BCAST   : 1ringM
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- The matrix A is randomly generated for each test.
- The following scaled residual check will be computed:
  ||Ax-b||_oo / ( eps * ( || x ||_oo * || A ||_oo + || b ||_oo ) * N )
- The relative machine precision (eps) is taken to be 1.110223e-16
- Computational tests pass if scaled residuals are less than 16.0

```

```

=====
T/V      N      NB      P      Q      Time      Gflops
-----

```

WC11C2R4 2560 80 1 1 6.19 1.809e+00

 ||Ax-b||_oo/(eps*(||A||_oo*||x||_oo+||b||_oo)*N)= 0.0062163 PASSED
 =====

Finished 1 tests with the following results:
 1 tests completed and passed residual checks,
 0 tests completed and failed residual checks,
 0 tests skipped because of illegal input values.

 End of Tests.

=====

Current time (1510934881) is Fri Nov 17 18:08:01 2017

End of HPL section.

Begin of Summary section.

VersionMajor=1

VersionMinor=4

VersionMicro=2

VersionRelease=f

LANG=C

Success=1

sizeof_char=1

sizeof_short=2

sizeof_int=4

sizeof_long=8

sizeof_void_ptr=8

sizeof_size_t=8

sizeof_float=4

sizeof_double=8

sizeof_s64Int=8

sizeof_u64Int=8

sizeof_struct_double_double=16

CommWorldProcs=1

MPI_Wtick=1.000000e-06

HPL_Tflops=0.00180869

HPL_time=6.18936

HPL_eps=1.11022e-16

HPL_RnormI=3.24358e-12

HPL_Anorm1=666.101

HPL_AnormI=663.835

HPL_Xnorm1=1494.04

HPL_XnormI=2.76479

HPL_BnormI=0.499975

HPL_N=2560

HPL_NB=80

HPL_nprow=1

HPL_npcol=1

HPL_depth=1

HPL_nbdiv=2

HPL_nbmin=4

HPL_cpfact=R

HPL_crfact=C

HPL_ctop=1

HPL_order=C

HPL_dMACH_EPS=1.110223e-16

HPL_dMACH_SFMIN=2.225074e-308

HPL_dMACH_BASE=2.000000e+00

HPL_dMACH_PREC=2.220446e-16

HPL_dMACH_MLEN=5.300000e+01

HPL_dMACH_RND=1.000000e+00
HPL_dMACH_EMIN=-1.021000e+03
HPL_dMACH_RMIN=2.225074e-308
HPL_dMACH_EMAX=1.024000e+03
HPL_dMACH_RMAX=1.797693e+308
HPL_sMACH_EPS=5.960464e-08
HPL_sMACH_SFMIN=1.175494e-38
HPL_sMACH_BASE=2.000000e+00
HPL_sMACH_PREC=1.192093e-07
HPL_sMACH_MLEN=2.400000e+01
HPL_sMACH_RND=1.000000e+00
HPL_sMACH_EMIN=-1.250000e+02
HPL_sMACH_RMIN=1.175494e-38
HPL_sMACH_EMAX=1.280000e+02
HPL_sMACH_RMAX=3.402823e+38
dweeps=1.110223e-16
sweeps=5.960464e-08
HPLMaxProcs=1
HPLMinProcs=1
DGEMM_N=1477
StarDGEMM_Gflops=1.3858
SingleDGEMM_Gflops=1.37687
PTRANS_GBs=1.03035
PTRANS_time=0.012342
PTRANS_residual=0
PTRANS_n=1280
PTRANS_nb=80
PTRANS_nprow=1
PTRANS_npcol=1
MPIRandomAccess_LCG_N=4194304
MPIRandomAccess_LCG_time=4.98483
MPIRandomAccess_LCG_CheckTime=0.336566
MPIRandomAccess_LCG_Errors=0
MPIRandomAccess_LCG_ErrorsFraction=0
MPIRandomAccess_LCG_ExeUpdates=16777216
MPIRandomAccess_LCG_GUPs=0.00336565
MPIRandomAccess_LCG_TimeBound=60
MPIRandomAccess_LCG_Algorithm=0
MPIRandomAccess_N=4194304
MPIRandomAccess_time=4.94476
MPIRandomAccess_CheckTime=0.330461
MPIRandomAccess_Errors=0
MPIRandomAccess_ErrorsFraction=0
MPIRandomAccess_ExeUpdates=16777216
MPIRandomAccess_GUPs=0.00339293
MPIRandomAccess_TimeBound=60
MPIRandomAccess_Algorithm=0
RandomAccess_LCG_N=4194304
StarRandomAccess_LCG_GUPs=0.0591597
SingleRandomAccess_LCG_GUPs=0.0595344
RandomAccess_N=4194304
StarRandomAccess_GUPs=0.0576083
SingleRandomAccess_GUPs=0.0579518
STREAM_VectorSize=2184533
STREAM_Threads=1
StarSTREAM_Copy=6.14836
StarSTREAM_Scale=6.00039
StarSTREAM_Add=6.38286
StarSTREAM_Triad=6.38434
SingleSTREAM_Copy=6.14836
SingleSTREAM_Scale=6.00039


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SingleSTREAM_Add=6.64659
SingleSTREAM_Triad=6.61898
FFT_N=1048576
StarFFT_Gflops=1.99718
SingleFFT_Gflops=1.94231
MPIFFT_N=524288
MPIFFT_Gflops=0.91316
MPIFFT_maxErr=1.45857e-15
MPIFFT_Procs=1
MaxPingPongLatency_usec=-1
RandomlyOrderedRingLatency_usec=-1
MinPingPongBandwidth_GBytes=-1
NaturallyOrderedRingBandwidth_GBytes=-1
RandomlyOrderedRingBandwidth_GBytes=-1
MinPingPongLatency_usec=-1
AvgPingPongLatency_usec=-1
MaxPingPongBandwidth_GBytes=-1
AvgPingPongBandwidth_GBytes=-1
NaturallyOrderedRingLatency_usec=-1
FFTEblk=16
FFTEnp=8
FFTEl2size=1048576
M_OPENMP=-1
omp_get_num_threads=0
omp_get_max_threads=0
omp_get_num_procs=0
MemProc=64
MemSpec=-1
MemVal=-1
MPIFFT_time0=9.53674e-07
MPIFFT_time1=0.00709319
MPIFFT_time2=0.009866
MPIFFT_time3=0.00330782
MPIFFT_time4=0.024533
MPIFFT_time5=0.00679612
MPIFFT_time6=9.53674e-07
CPS_HPCC_FFT_235=0
CPS_HPCC_FFTW_ESTIMATE=0
CPS_HPCC_MEMALLCTR=0
CPS_HPL_USE_GETPROCESSTIMES=0
CPS_RA_SANDIA_NOPT=0
CPS_RA_SANDIA_OPT2=0
CPS_USING_FFTW=0
End of Summary section.
#####
End of HPC Challenge tests.
Current time (1510934881) is Fri Nov 17 18:08:01 2017

#####

```