IBM Corporation

IBM BladeCenter LS42 (AMD Opteron 8435)

SPECfp\_rate2006 = 274
SPECfp\_rate_base2006 = 250

**Hardware**

- **CPU Name:** AMD Opteron 8435
- **CPU Characteristics:**
  - CPU MHz: 2600
  - FPU: Integrated
  - CPU(s) enabled: 24 cores, 4 chips, 6 cores/chip
  - CPU(s) orderable: 1,2,3,4 chips
  - Primary Cache: 64 KB I + 64 KB D on chip per core
  - Secondary Cache: 512 KB I+D on chip per core

**Software**

- **Operating System:** Red Hat Enterprise Linux Server release 5.3, Kernel 2.6.18-128.el5 on an x86_64
- **Compiler:** PGI Server Complete Version 8.0 x86 Open64 4.2.2 Compiler Suite (from AMD)
- **Auto Parallel:** Yes
- **File System:** ext3
- **System State:** Run level 3 (Full multiuser with network)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 32/64-bit

**Test Details**

- **CPU2006 license:** 11
- **Test sponsor:** IBM Corporation
- **Tested by:** IBM Corporation
- **Test date:** Jun-2009
- **Hardware Availability:** Sep-2009
- **Software Availability:** Apr-2009
IBM Corporation

IBM BladeCenter LS42 (AMD Opteron 8435)

SPEC CFP2006 Result

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SPECfp_rate2006 = 274
SPECfp_rate_base2006 = 250

CPU2006 license: 11
Test date: Jun-2009
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Test Hardware Availability: Sep-2009
Test Software Availability: Apr-2009

L3 Cache: 6 MB I+D on chip per chip
Other Cache: None
Memory: 64 GB (16 x 4 GB, PC2-6400 ECC)
Disk Subsystem: 1 x 73 GB SAS, 10000 RPM
Other Hardware: None
Other Software: binutils 2.18

Results Table

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</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

The config file option 'submit' was used.
'numactl' was used to bind copies to the cores.
See the configuration file for details.

Operating System Notes

'ulimit -s unlimited' was used to set environment stack size
'ulimit -l 2097152' was used to set environment locked pages in memory limit

Set vm/nr_hugepages=10800 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages

Processor Performance States Disabled in BIOS
Memory ChipKill Disabled in BIOS

Standard Performance Evaluation Corporation
info@spec.org
http://www.spec.org/
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General Notes

Environment variables set by runspec before the start of the run:
HUGETLB_LIMIT = "450"
LD_LIBRARY_PATH = "/cpu2006/amd0905is-libs/64:/cpu2006/amd0905is-libs/32"
NCPUS = "6"
PGI_HUGE_PAGES = "450"

The x86 Open64 Compiler Suite is only available from (and supported by) AMD at

Base Compiler Invocation

C benchmarks:
pgcc

C++ benchmarks:
pgcpp

Fortran benchmarks:
pgf95

Benchmarks using both Fortran and C:
pgcc pgf95

Base Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64 -Mnomain
436.cactusADM: -DSPEC_CPU_LP64 -Mnomain
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.dealII: -DSPEC_CPU_LP64
450.soplex: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64 -Mnomain
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
482.sphinx3: -DSPEC_CPU_LP64
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Base Optimization Flags

C benchmarks:
- fastsse -Msmartalloc=huge -Mfprelaxed -Mipa=fast -Mipa=inline
- tp shanghai-64 -Bstatic_pgi

C++ benchmarks:
- fastsse -Msmartalloc=huge -Mfprelaxed --zc_eh -Mipa=fast
- Mipa=inline -tp shanghai-64 -Bstatic_pgi

Fortran benchmarks:
- fastsse -Msmartalloc=huge -Mfprelaxed -Mvect=short -Mipa=fast
- Mipa=inline -tp shanghai-64 -Bstatic_pgi

Benchmarks using both Fortran and C:
- fastsse -Msmartalloc=huge -Mfprelaxed -Mipa=fast -Mipa=inline
- tp shanghai-64 -Mvect=short -Bstatic_pgi

Base Other Flags

C benchmarks:
- Mipa=jobs:4

C++ benchmarks:
- Mipa=jobs:4

Fortran benchmarks:
- Mipa=jobs:4

Benchmarks using both Fortran and C:
- Mipa=jobs:4

Peak Compiler Invocation

C benchmarks:
pgcc

C++ benchmarks (except as noted below):
openCC

444.namd: pgcpp

Fortran benchmarks (except as noted below):
openf95

410.bwaves: pgf95

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Peak Compiler Invocation (Continued)

434.zeusmp: pgf95
437.leslie3d: pgf95

Benchmarks using both Fortran and C (except as noted below):
pgcc pgf95
435.gromacs: opencc openf95

Peak Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.gamesh: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64
436.cactusADM: -DSPEC_CPU_LP64 -Mnomain
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64 -Mnomain
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
482.sphinx3: -DSPEC_CPU_LP64

Peak Optimization Flags

C benchmarks:
433.milc: basepeak = yes
470.lbm: -fastsse -Msmartalloc=huge -Mprefetch=t0 -Mloop32
-Mfprelaxed -Mipa=fast -Mipa=inline -tp shanghai-64
-Bstatic_pgi
482.sphinx3: -Mpf=indirect(pass 1) -Mpf=indirect(pass 2)
-Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse
-Mfprelaxed -Msmartalloc -tp shanghai-64 -Bstatic_pgi

C++ benchmarks:
444.namd: -Mpf(pass 1) -Mpf(pass 2) -Mipa=fast(pass 2)
-Mipa=inline(pass 2) -fastsse -Munroll=n:4 -Munroll=m:8
-Msmartalloc=huge -Mnodepchk -Mfprelaxed --zc_eh
-tp shanghai-64 -Bstatic_pgi

Continued on next page
## Peak Optimization Flags (Continued)

447.dealII: -march=barcelona -Ofast -static -INLINE:aggressive=on
   -LNO:opt=0 -Wf,-fno-exceptions -m32 -OPT:unroll_times_max=8
   -OPT:unroll_size=256 -OPT:unroll_level=2 -HP:bdt=2m:heap=2m
   -GRA:unspill=on -CG:cmp_peep=on -TENV:frame_pointer=off

450.soplex: -march=barcelona -fb_create fbdata(pass 1)
   -fb_opt fbdata(pass 2) -O3 -INLINE:aggressive=on
   -OPT:IEEE_arith=3 -OPT:IEEE_NaN_Inf=off
   -OPT:fold_unsigned_relops=on -OPT:malloc_alg=1
   -CG:load_exe=0 -fno-exceptions -m32 -HP:bdt=2m

453.povray: -march=barcelona -fb_create fbdata(pass 1)
   -fb_opt fbdata(pass 2) -Ofast -INLINE:aggressive=on
   -HP:bdt=2m:heap=2m

Fortran benchmarks:

410.bwaves: -fastsse -Msmartalloc -Mprefetch=nta -Mfprelaxed
   -Mipa=fast -Mipa:inline -tp shanghai-64 -Bstatic_pgi

416.games: -march=barcelona -fb_create fbdata(pass 1)
   -fb_opt fbdata(pass 2) -O2 -OPT:Ofast -OPT:ro=3
   -OPT:unroll_size=256 -HP:bdt=2m:heap=2m

434.zeusmp: -fastsse -Mfprelaxed -Mprefetch=distance:8 -Mprefetch=t0
   -Msmartalloc=huge -Msmartalloc=hugebss -Mipa=fast
   -Mipa=inline -tp shanghai-64 -Bstatic_pgi

437.leslie3d: -mpfi=indirect(pass 1) -mpfo=indirect(pass 2)
   -Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse
   -Mvect=fuse -Msmartalloc=huge -Mprefetch=distance:8
   -Mprefetch=t0 -Mfprelaxed -tp shanghai-64 -Bstatic_pgi

454.calculix: -mpfi=indirect(pass 1) -mpfo=indirect(pass 2)
   -Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse
   -Mvect=short -Msmartalloc=huge -Mprefetch=t0 -Mpre

Benchmarks using both Fortran and C:

435.gromacs: -march=barcelona -Ofast -OPT:rsqrt=2 -HP:bdt=2m:heap=2m

436.cactusADM: -fastsse -Mconcur -Msmartalloc=huge -Mfprelaxed -Mipa=fast
   -Mipa=inline -tp shanghai-64 -Bstatic_pgi

454.calculix: -mpfi=indirect(pass 1) -mpfo=indirect(pass 2)
   -Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse
   -Mvect=short -Msmartalloc=huge -Mprefetch=t0 -Mpre

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IBM Corporation

IBM BladeCenter LS42 (AMD Opteron 8435)

**SPECfp_rate2006 = 274**

**SPECfp_rate_base2006 = 250**

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<td>Software Availability</td>
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**Peak Optimization Flags (Continued)**

454.calculix (continued):
- `-Mfprelaxed`  
- `-tp shanghai-64`  
- `-Bstatic_pgi`

481.wrf:
- `-fastsse`  
- `-Mvect=noaltcode`  
- `-Msmartalloc=huge`  
- `-Mprefetch=distance:8`  
- `-Mfprelaxed`  
- `-tp shanghai-64`  
- `-Bstatic_pgi`

**Peak Other Flags**

C benchmarks:
- `-Mipa=jobs:4` (pass 2)

C++ benchmarks:
- 444.namd: `-Mipa=jobs:4` (pass 2)

Fortran benchmarks:
- 410.bwaves: `-Mipa=jobs:4`
- 434.zeusmp: `-Mipa=jobs:4`
- 437.leslie3d: `-Mipa=jobs:4` (pass 2)

Benchmarks using both Fortran and C:
- 436.cactusADM: `-Mipa=jobs:4`
- 454.calculix: `-Mipa=jobs:4` (pass 2)

The flags files that were used to format this result can be browsed at

http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090710.html

http://www.spec.org/cpu2006/flags/x86-open64-4.2.2-flags-revA.20090710.html

http://www.spec.org/cpu2006/flags/amd-platform.20090728.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090710.xml

http://www.spec.org/cpu2006/flags/x86-open64-4.2.2-flags-revA.20090710.xml

http://www.spec.org/cpu2006/flags/amd-platform.20090728.xml
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For questions about this result, please contact the tester. For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.1.