



SPEC® CFP2006 Result

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Sun Microsystems

SPECfp®_rate2006 = 103

Sun Fire X4140 (AMD Opteron 2384 2.7GHz)

SPECfp_rate_base2006 = 92.7

CPU2006 license: 6

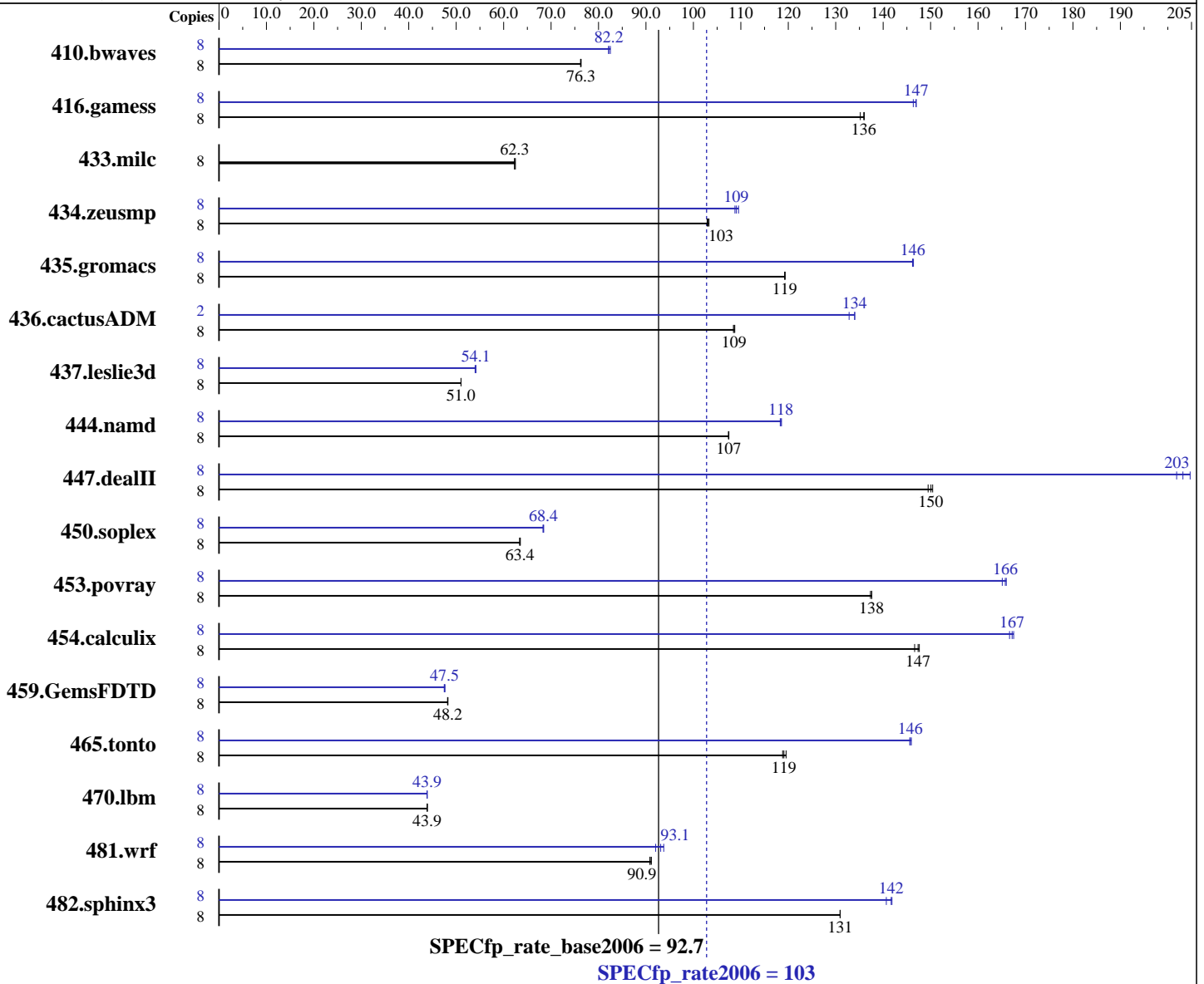
Test date: Sep-2009

Test sponsor: Sun Microsystems

Hardware Availability: Jan-2009

Tested by: Sun Microsystems

Software Availability: Jul-2009



Hardware

CPU Name: AMD Opteron 2384
 CPU Characteristics:
 CPU MHz: 2700
 FPU: Integrated
 CPU(s) enabled: 8 cores, 2 chips, 4 cores/chip
 CPU(s) orderable: 1 or 2 chips
 Primary Cache: 64 KB I + 64 KB D on chip per core
 Secondary Cache: 512 KB I+D on chip per core

Continued on next page

Software

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

Continued on next page



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L3 Cache: 6 MB I+D on chip per chip
 Other Cache: None
 Memory: 32 GB (8x4GB, DDR2-667, CL5, Reg. Dual Rank)
 Disk Subsystem: SAS, 72 GB, 10 K RPM
 Other Hardware: See additional details below

Other Software: binutils 2.18

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	8	1427	76.2	<u>1425</u>	<u>76.3</u>	1424	76.3	8	1318	82.5	1324	82.1	<u>1323</u>	<u>82.2</u>
416.gamess	8	1159	135	<u>1153</u>	<u>136</u>	1152	136	8	1066	147	1070	146	<u>1066</u>	<u>147</u>
433.milc	8	<u>1178</u>	<u>62.3</u>	1179	62.3	1175	62.5	8	<u>1178</u>	<u>62.3</u>	1179	62.3	1175	62.5
434.zeusmp	8	705	103	708	103	<u>706</u>	<u>103</u>	8	<u>668</u>	<u>109</u>	665	110	669	109
435.gromacs	8	479	119	479	119	<u>479</u>	<u>119</u>	8	390	146	391	146	<u>391</u>	<u>146</u>
436.cactusADM	8	879	109	<u>880</u>	<u>109</u>	882	108	2	178	134	<u>178</u>	<u>134</u>	180	133
437.leslie3d	8	1474	51.0	1474	51.0	<u>1474</u>	<u>51.0</u>	8	1389	54.1	<u>1389</u>	<u>54.1</u>	1393	54.0
444.namd	8	597	107	597	107	<u>597</u>	<u>107</u>	8	542	118	<u>542</u>	<u>118</u>	541	119
447.dealII	8	608	150	<u>610</u>	<u>150</u>	612	149	8	447	205	<u>450</u>	<u>203</u>	453	202
450.soplex	8	1053	63.4	1050	63.5	<u>1052</u>	<u>63.4</u>	8	977	68.3	<u>975</u>	<u>68.4</u>	975	68.4
453.povray	8	309	138	310	137	<u>309</u>	<u>138</u>	8	258	165	256	166	<u>257</u>	<u>166</u>
454.calculix	8	<u>448</u>	<u>147</u>	447	148	450	147	8	<u>395</u>	<u>167</u>	394	168	396	167
459.GemsFDTD	8	1762	48.2	1759	48.3	<u>1760</u>	<u>48.2</u>	8	<u>1785</u>	<u>47.5</u>	1782	47.6	1788	47.5
465.tonto	8	<u>661</u>	<u>119</u>	663	119	659	120	8	<u>540</u>	<u>146</u>	539	146	541	146
470.lbm	8	2503	43.9	<u>2505</u>	<u>43.9</u>	2506	43.9	8	2506	43.9	<u>2506</u>	<u>43.9</u>	2506	43.9
481.wrf	8	<u>983</u>	<u>90.9</u>	980	91.1	984	90.8	8	953	93.7	971	92.0	<u>960</u>	<u>93.1</u>
482.sphinx3	8	<u>1191</u>	<u>131</u>	1191	131	1191	131	8	1099	142	<u>1100</u>	<u>142</u>	1108	141

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=7168 in /etc/sysctl.conf
 mount -t hugetlbfs nodev /mnt/hugepages



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Platform Notes

Default BIOS settings used except:
DCT Unganged Mode set to "Always" to enable unganged mode.

General Notes

Environment variables set by runspec before the start of the run:

HUGETLB_LIMIT = "896"

LD_LIBRARY_PATH = "/data1/SPECcpu2006v1.1-pegasus215/amd0905is-libs/64:/data1/SPECcpu2006v1.1-pegasus215/amd0905is-libs/32"

NCPUS = "4"

PGI_HUGE_PAGES = "896"

The x86 Open64 Compiler Suite is only available from (and supported by) AMD at
http://developer.amd.com/cpu/open64.

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
```

Continued on next page



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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.gamess: -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: -Mphi=indirect(pass 1) -Mpfo=indirect(pass 2)
-Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse
-Mfprelaxed -Msmartalloc -tp shanghai-64 -Bstatic_pgi

C++ benchmarks:

444.namd: -Mphi(pass 1) -Mpfo(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



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Peak Optimization Flags (Continued)

447.deallI: -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.gamess: -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: -Mphi=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

459.GemsFDTD: -march=barcelona -Ofast -LNO:fission=2 -LNO:simd=2
-LNO:prefetch_ahead=1 -CG:load_exe=0 -HP

465.tonto: -march=barcelona -Ofast -OPT:alias=no_f90_pointer_alias
-LNO:blocking=off -CG:load_exe=1 -IPA:plimit=525 -HP

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: -Mphi=indirect(pass 1) -Mpfo=indirect(pass 2)
-Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse
-Mvect=short -Msmartalloc=huge -Mprefetch=t0 -Mpre

Continued on next page



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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/amd-platform.20090929.html>

http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090915.html

<http://www.spec.org/cpu2006/flags/x86-open64-4.2.2-flags-revE.20090915.html>

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

<http://www.spec.org/cpu2006/flags/amd-platform.20090929.xml>

http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090915.xml

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