



SPEC[®] CINT2006 Result

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Sun Microsystems

SPECint[®]_rate2006 = 280

Sun Blade X6440 (AMD Opteron 8384 2.7GHz)

SPECint_rate_base2006 = 218

CPU2006 license: 6

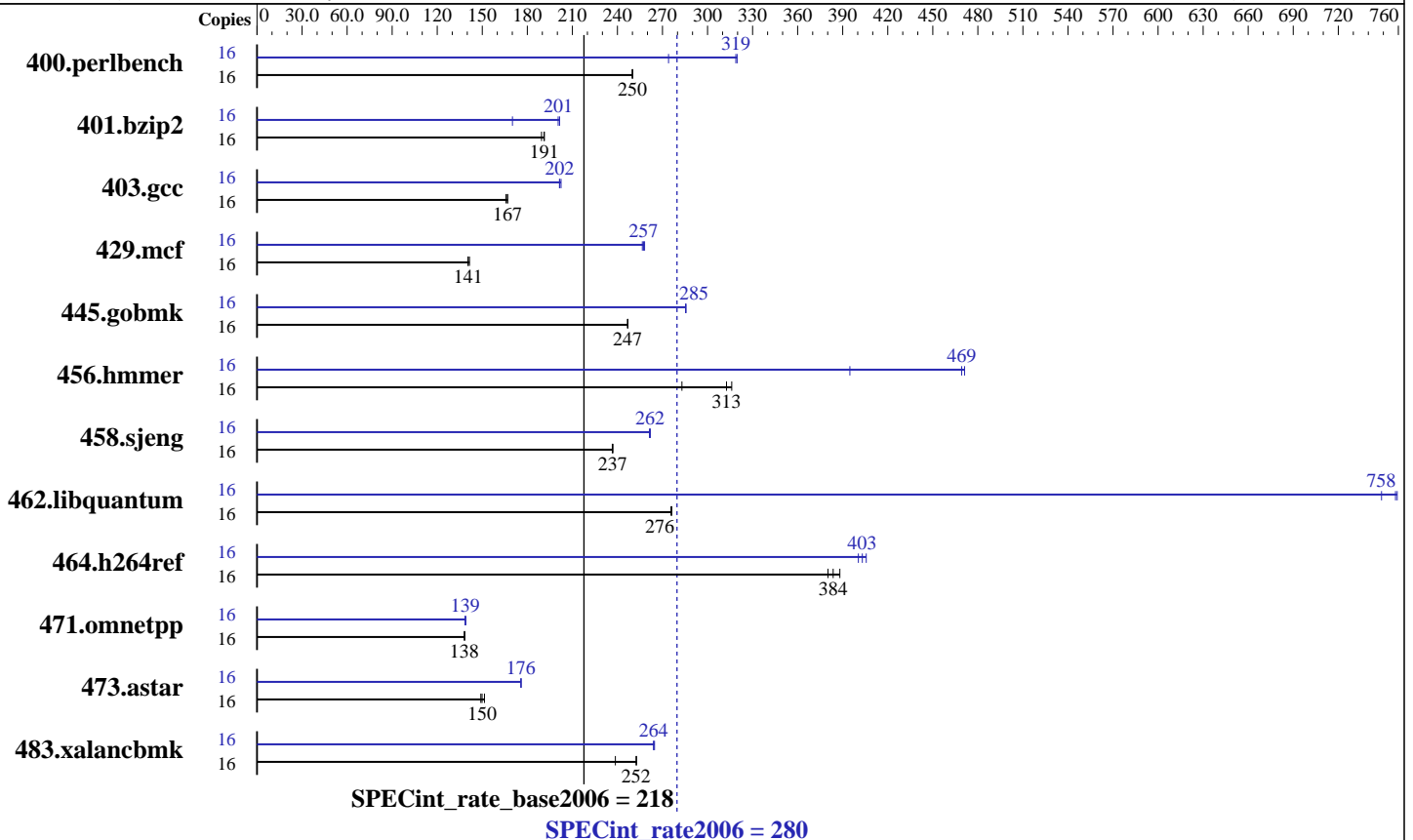
Test date: Aug-2009

Test sponsor: Sun Microsystems

Hardware Availability: Jan-2009

Tested by: Sun Microsystems

Software Availability: Jun-2009



Hardware

CPU Name: AMD Opteron 8384
 CPU Characteristics:
 CPU MHz: 2700
 FPU: Integrated
 CPU(s) enabled: 16 cores, 4 chips, 4 cores/chip
 CPU(s) orderable: 2 or 4 chips
 Primary Cache: 64 KB I + 64 KB D on chip per core
 Secondary Cache: 512 KB I+D on chip per core
 L3 Cache: 6 MB I+D on chip per chip
 Other Cache: None
 Memory: 64 GB (16x4GB, DDR2-667, CL5, Reg, Dual Rank)
 Disk Subsystem: 1 x 80 GB 10 K RPM SATA via NFS
 Other Hardware: See additional details below

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: No
 File System: NFSv3
 System State: Run level 3 (Full multiuser with network)
 Base Pointers: 32/64-bit
 Peak Pointers: 32/64-bit
 Other Software: binutils 2.18 SmartHeap 8.1 32-bit Library for Linux



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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	16	625	250	626	250	<u>625</u>	<u>250</u>	16	570	274	<u>490</u>	<u>319</u>	489	320
401.bzip2	16	<u>807</u>	<u>191</u>	807	191	815	189	16	908	170	766	201	<u>770</u>	<u>201</u>
403.gcc	16	772	167	777	166	<u>772</u>	<u>167</u>	16	640	201	636	202	<u>639</u>	<u>202</u>
429.mcf	16	<u>1038</u>	<u>141</u>	1038	141	1031	141	16	569	257	<u>567</u>	<u>257</u>	565	258
445.gobmk	16	680	247	<u>680</u>	<u>247</u>	680	247	16	<u>588</u>	<u>285</u>	588	286	588	285
456.hammer	16	528	283	<u>478</u>	<u>313</u>	472	316	16	378	395	<u>318</u>	<u>469</u>	317	471
458.sjeng	16	<u>817</u>	<u>237</u>	817	237	818	237	16	<u>740</u>	<u>262</u>	741	261	739	262
462.libquantum	16	<u>1202</u>	<u>276</u>	1202	276	1200	276	16	443	749	437	759	<u>437</u>	<u>758</u>
464.h264ref	16	931	380	912	388	<u>923</u>	<u>384</u>	16	884	400	<u>878</u>	<u>403</u>	873	406
471.omnetpp	16	<u>724</u>	<u>138</u>	723	138	724	138	16	719	139	<u>721</u>	<u>139</u>	722	139
473.astar	16	<u>750</u>	<u>150</u>	742	151	754	149	16	639	176	639	176	<u>639</u>	<u>176</u>
483.xalancbmk	16	463	239	<u>437</u>	<u>252</u>	437	253	16	418	264	417	265	<u>418</u>	<u>264</u>

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=14336 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages

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"
PGI_HUGE_PAGES = "896"

The NFS server used was a Sun Fire X2100 M2 containing 1 x 80 GB 10 K RPM SATA disks.
Connections to the clients were via gigabit ethernet.
The x86 Open64 Compiler Suite is only available from (and supported by) AMD at

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General Notes (Continued)

<http://developer.amd.com/cpu/open64>

Base Compiler Invocation

C benchmarks:

openc

C++ benchmarks:

openCC

Base Portability Flags

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -DSPEC_CPU_LP64
403.gcc: -DSPEC_CPU_LP64
429.mcf: -DSPEC_CPU_LP64
445.gobmk: -DSPEC_CPU_LP64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
464.h264ref: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LINUX

Base Optimization Flags

C benchmarks:

-march=barcelona -Ofast -CG:local_sched_alg=1 -HP:bdt=2m:heap=2m

C++ benchmarks:

-march=barcelona -Ofast -m32 -INLINE:aggressive=on
-L/root/work/libraries/SmartHeap-8.1/lib -lsmarheap

Peak Compiler Invocation

C benchmarks (except as noted below):

openc

456.hmmer: pgcc

C++ benchmarks (except as noted below):

openCC

473.astar: pgcpp



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Peak Portability Flags

```

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -DSPEC_CPU_LP64
445.gobmk: -DSPEC_CPU_LP64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
464.h264ref: -DSPEC_CPU_LP64
483.xalanbmk: -DSPEC_CPU_LINUX

```

Peak Optimization Flags

C benchmarks:

```

400.perlbench: -march=barcelona -fb_create fbdata(pass 1)
               -fb_opt fbdata(pass 2) -Ofast -IPA:plimit=20000 -LNO:opt=0
               -OPT:unroll_times_max=8 -OPT:unroll_size=256
               -OPT:unroll_level=2 -OPT:keep_ext=on -WOPT:if_conv=0
               -CG:local_sched_alg=1 -CG:unroll_fb_req=on
               -HP:bdt=2m:heap=2m

401.bzip2: -march=barcelona -fb_create fbdata(pass 1)
            -fb_opt fbdata(pass 2) -O3 -OPT:alias=disjoint
            -OPT:unroll_size=0 -OPT:Ofast -OPT:goto=off
            -INLINE:aggressive=on -CG:local_sched_alg=1 -m3dnw
            -HP:bdt=2m:heap=2m

403.gcc: -march=barcelona -fb_create fbdata(pass 1)
          -fb_opt fbdata(pass 2) -Ofast -LNO:trip_count=256
          -LNO:prefetch_ahead=10 -CG:cmp_peep=on -m32
          -HP:bdt=2m:heap=2m -GRA:unspill=on

429.mcf: -march=barcelona -O3 -ipa -INLINE:aggressive=on
          -CG:gcm=off -GRA:prioritize_by_density=on -m32
          -HP:bdt=2m:heap=2m

445.gobmk: -march=barcelona -fb_create fbdata(pass 1)
            -fb_opt fbdata(pass 2) -O3 -OPT:alias=restrict
            -OPT:unroll_times_max=8 -OPT:unroll_size=256
            -OPT:unroll_level=2 -OPT:keep_ext=on -ipa -IPA:plimit=750
            -IPA:min_hotness=300 -IPA:pu_reorder=1 -LNO:prefetch=1
            -LNO:ignore_feedback=off -CG:p2align=on
            -CG:unroll_fb_req=on -HP:bdt=2m:heap=2m

456.hmmer: -fastsse -Mvect=partial -Munroll=n:8 -Msmartalloc=huge
            -Msafeptr -Mprefetch=t0 -Mfprelaxed -Mipa=const -Mipa=ptr
            -Mipa=arg -Mipa=inline -tp shanghai-64 -Bstatic_pgi

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Peak Optimization Flags (Continued)

458.sjeng: -march=barcelona -fb_create fbdata(pass 1)
 -fb_opt fbdata(pass 2) -O3 -ipa -LNO:ignore_feedback=off
 -LNO:full_unroll=10 -LNO:fusion=0 -LNO:fission=2
 -IPA:pu_reorder=2 -CG:ptr_load_use=0
 -OPT:unroll_times_max=8 -INLINE:aggressive=on
 -HP:bdt=2m:heap=2m

462.libquantum: -march=barcelona -Ofast -LNO:pf2=0 -CG:gcm=off
 -CG:use_prefetchnta=on -CG:cmp_peep=on -WOPT:aggstr=0
 -HP:bdt=2m:heap=2m -OPT:alias=disjoint
 -INLINE:aggressive=on -IPA:space=1000 -IPA:plimit=20000

464.h264ref: -march=barcelona -fb_create fbdata(pass 1)
 -fb_opt fbdata(pass 2) -O3 -IPA:plimit=20000
 -OPT:alias=disjoint -LNO:prefetch=0 -CG:ptr_load_use=0
 -CG:push_pop_int_saved_regs=off -HP:bdt=2m:heap=2m

C++ benchmarks:

471.omnetpp: -march=barcelona -Ofast -CG:gcm=off -INLINE:aggressive=on
 -OPT:alias=disjoint -WOPT:if_conv=0 -m32
 -L/root/work/libraries/SmartHeap-8.1/lib -lsmarheap

473.astar: -Mpfi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2)
 -Mipa=inline:6(pass 2) -fastsse -O4 -Msmartalloc=huge
 -Msafeptr=global -Mfp relaxed --zc_eh -tp shanghai-32
 -Bstatic_pgi

483.xalancbmk: -march=barcelona -Ofast -INLINE:aggressive=on -m32
 -CG:cmp_peep=on -GRA:unspill=on -TENV:frame_pointer=off
 -L/root/work/libraries/SmartHeap-8.1/lib -lsmarheap

Peak Other Flags

C benchmarks:

456.hmmmer: -Mipa=jobs:4

C++ benchmarks:

473.astar: -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.20090710.html>

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

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



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

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<http://www.spec.org/cpu2006/flags/x86-open64-4.2.2-flags-revE.20090915.xml>
http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090915.xml

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