



# SPEC® CINT2006 Result

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## Sun Microsystems

### SPECint®\_rate2006 = 368

### Sun Blade X6440 (AMD Opteron 8435 2.6GHz)

### SPECint\_rate\_base2006 = 287

CPU2006 license: 6

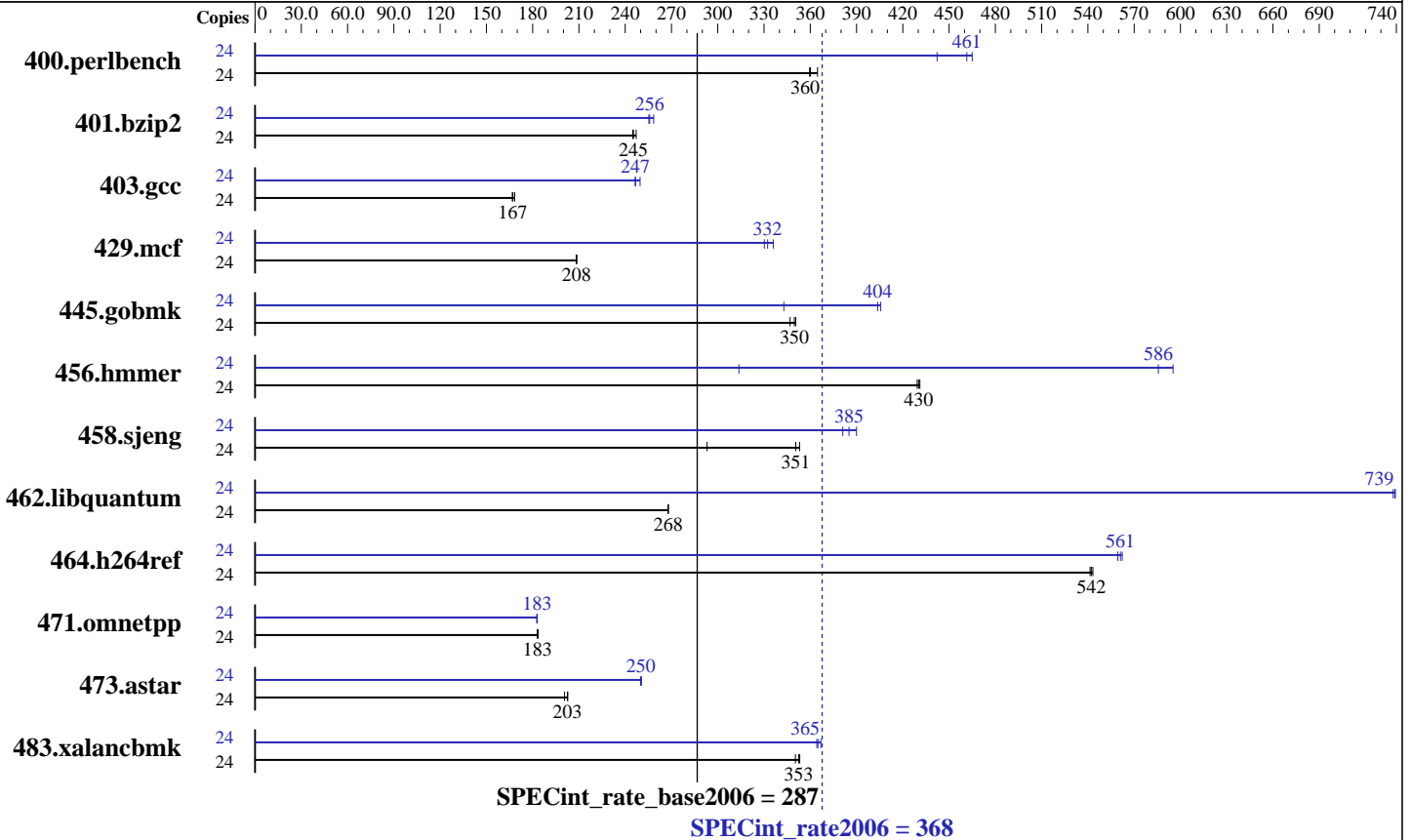
Test sponsor: Sun Microsystems

Tested by: Sun Microsystems

Test date: Aug-2009

Hardware Availability: Jul-2009

Software Availability: Apr-2009



#### Hardware

CPU Name: AMD Opteron 8435  
 CPU Characteristics: 2600  
 CPU MHz: Integrated  
 FPU: 24 cores, 4 chips, 6 cores/chip  
 CPU(s) enabled: 2 or 4 chips  
 CPU(s) orderable: 64 KB I + 64 KB D on chip per core  
 Primary Cache: 512 KB I+D on chip per core  
 Secondary Cache: 6 MB I+D on chip per chip  
 L3 Cache: None  
 Other Cache: 64 GB (16x4GB, DDR2-667, CL5, Reg, Dual Rank)  
 Memory: 48 x 250GB 7200RPM SATA via NFS  
 Disk Subsystem: See additional details below  
 Other Hardware:

#### Software

Operating System: SuSE Linux Enterprise Server 10 (x86\_64) SP2, Kernel 2.6.16.60-0.21-smp  
 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	24	643	365	<b>651</b>	<b>360</b>	652	360	24	530	442	504	465	<b>508</b>	<b>461</b>
401.bzip2	24	<b>944</b>	<b>245</b>	946	245	937	247	24	907	255	896	258	<b>905</b>	<b>256</b>
403.gcc	24	1148	168	<b>1156</b>	<b>167</b>	1158	167	24	784	246	774	250	<b>783</b>	<b>247</b>
429.mcf	24	1051	208	<b>1050</b>	<b>208</b>	1049	209	24	<b>659</b>	<b>332</b>	651	336	663	330
445.gobmk	24	718	351	<b>720</b>	<b>350</b>	726	347	24	621	406	<b>624</b>	<b>404</b>	734	343
456.hammer	24	519	431	522	429	<b>520</b>	<b>430</b>	24	<b>382</b>	<b>586</b>	714	314	376	595
458.sjeng	24	991	293	<b>828</b>	<b>351</b>	823	353	24	745	390	762	381	<b>754</b>	<b>385</b>
462.libquantum	24	<b>1857</b>	<b>268</b>	1855	268	1857	268	24	<b>673</b>	<b>739</b>	673	739	674	738
464.h264ref	24	<b>980</b>	<b>542</b>	978	543	981	541	24	945	562	949	559	<b>947</b>	<b>561</b>
471.omnetpp	24	817	184	820	183	<b>819</b>	<b>183</b>	24	821	183	820	183	<b>820</b>	<b>183</b>
473.astar	24	<b>832</b>	<b>203</b>	839	201	831	203	24	674	250	<b>673</b>	<b>250</b>	673	251
483.xalancbmk	24	469	353	473	350	<b>470</b>	<b>353</b>	24	451	367	455	364	<b>454</b>	<b>365</b>

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

## 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 = "450"

LD\_LIBRARY\_PATH = "/ctmp0/gnana/pegasus-istanbul-sles10sp2/amd0905is-libs/64:/ctmp0/gnana/pegasus-istanbul-sles10sp2/amd0905is-libs/32"

PGI\_HUGE\_PAGES = "450"

The NFS server used was a Sun Fire X4540 containing 48 x 250GB 7200RPM SATA disks.  
Connections to the clients were via gigabit ethernet.

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## General Notes (Continued)

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:  
opencc

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):  
opencc

456.hmmer: pgcc

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

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## Peak Compiler Invocation (Continued)

473.astar: pgcpp

## 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.xalancbmk: -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 -m3dnow
           -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

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## Peak Optimization Flags (Continued)

456.hmmr: -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

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: -Mphi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2)  
-Mipa=inline:6(pass 2) -fastsse -O4 -Msmartalloc=huge  
-Msafeptr=global -Mfprelaxed --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.hmmr: -Mipa=jobs:4

C++ benchmarks:

473.astar: -Mipa=jobs:4(pass 2)



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

<http://www.spec.org/cpu2006/flags/x86-open64-4.2.2-flags-revE.html>  
[http://www.spec.org/cpu2006/flags/pgi80\\_linux\\_flags.20090710.html](http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090710.html)  
<http://www.spec.org/cpu2006/flags/amd-platform.20090710.html>

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

<http://www.spec.org/cpu2006/flags/x86-open64-4.2.2-flags-revE.xml>  
[http://www.spec.org/cpu2006/flags/pgi80\\_linux\\_flags.20090710.xml](http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090710.xml)  
<http://www.spec.org/cpu2006/flags/amd-platform.20090710.xml>

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