



# SPEC® CINT2006 Result

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Tyan

(Test Sponsor: Advanced Micro Devices)

SPECint®\_rate2006 = 219

Transport TX46, AMD Opteron 8376 HE

SPECint\_rate\_base2006 = 178

CPU2006 license: 49

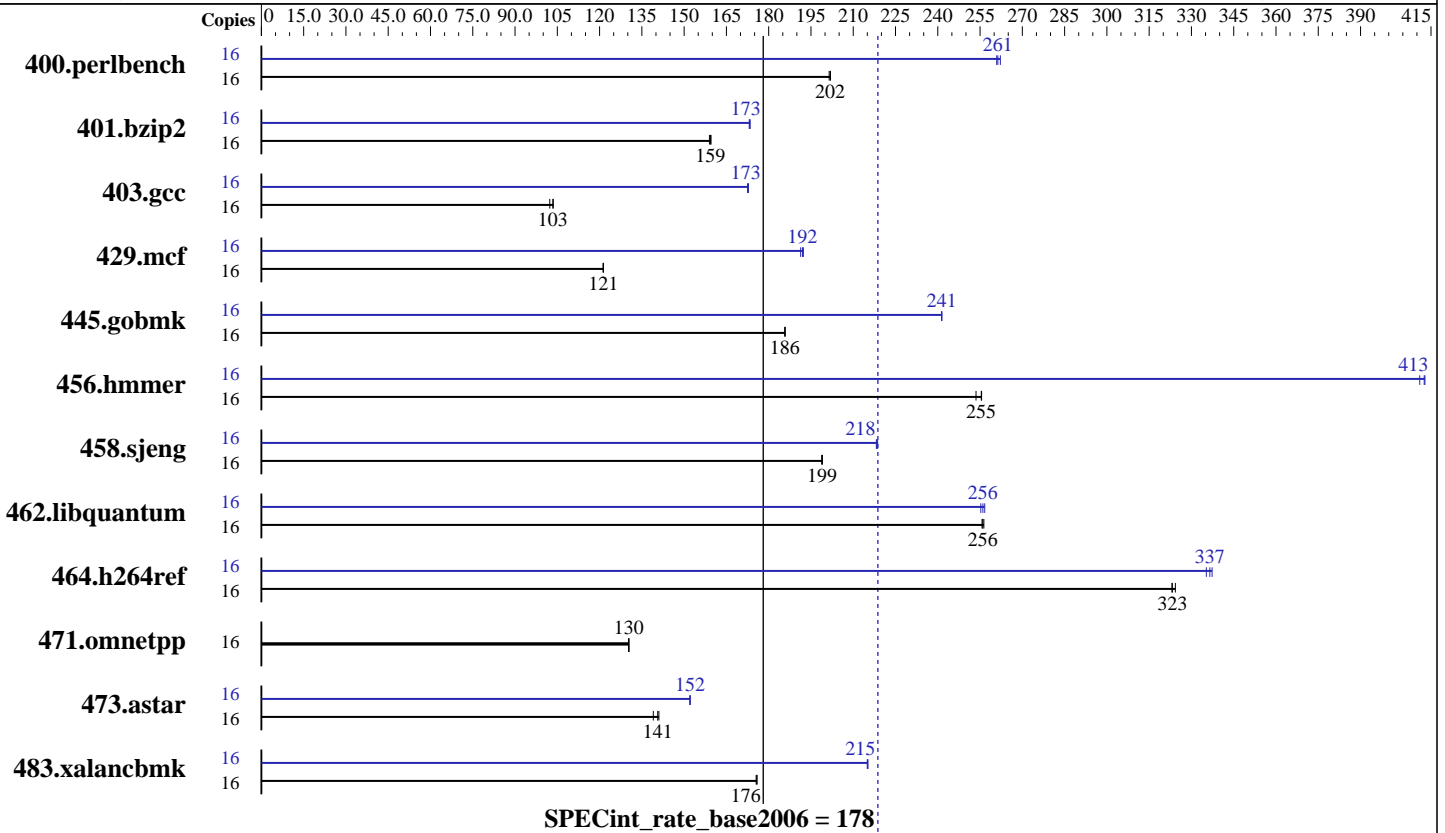
Test sponsor: Advanced Micro Devices

Tested by: Advanced Micro Devices

Test date: Nov-2008

Hardware Availability: Jan-2009

Software Availability: Jun-2008



## Hardware

CPU Name: AMD Opteron 8376 HE  
 CPU Characteristics:  
 CPU MHz: 2300  
 FPU: Integrated  
 CPU(s) enabled: 16 cores, 4 chips, 4 cores/chip  
 CPU(s) orderable: 2,4 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 (16x4 GB, DDR2-800, CL5, Reg, Dual Rank)  
 Disk Subsystem: 1 x 250 GB SATA, 7200 RPM  
 Other Hardware: None

## Software

Operating System: Red Hat Enterprise Linux Server release 5.2, Advanced Platform, Kernel 2.6.18-92.el5  
 Compiler: PGI Server Complete Version 7.2 PathScale Compiler Suite Version 3.2  
 Auto Parallel: No  
 File System: ext3  
 System State: Run level 3 (Full multiuser with network)  
 Base Pointers: 32/64-bit  
 Peak Pointers: 32/64-bit  
 Other Software: binutils 2.18  
 32-bit and 64-bit libhugetlbfs libraries  
 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	776	201	<b><u>774</u></b>	<b><u>202</u></b>	774	202	16	<b><u>598</u></b>	<b><u>261</u></b>	599	261	596	262
401.bzip2	16	968	160	971	159	<b><u>969</u></b>	<b><u>159</u></b>	16	890	173	892	173	<b><u>891</u></b>	<b><u>173</u></b>
403.gcc	16	1259	102	<b><u>1245</u></b>	<b><u>103</u></b>	1244	104	16	<b><u>746</u></b>	<b><u>173</u></b>	747	172	745	173
429.mcf	16	1202	121	1203	121	<b><u>1203</u></b>	<b><u>121</u></b>	16	<b><u>760</u></b>	<b><u>192</u></b>	763	191	759	192
445.gobmk	16	904	186	<b><u>903</u></b>	<b><u>186</u></b>	903	186	16	<b><u>695</u></b>	<b><u>241</u></b>	695	241	695	241
456.hammer	16	589	254	584	256	<b><u>584</u></b>	<b><u>255</u></b>	16	362	413	363	411	<b><u>362</u></b>	<b><u>413</u></b>
458.sjeng	16	974	199	973	199	<b><u>973</u></b>	<b><u>199</u></b>	16	<b><u>887</u></b>	<b><u>218</u></b>	885	219	887	218
462.libquantum	16	1293	256	<b><u>1295</u></b>	<b><u>256</u></b>	1297	256	16	<b><u>1295</u></b>	<b><u>256</u></b>	1299	255	1292	257
464.h264ref	16	<b><u>1095</u></b>	<b><u>323</u></b>	1092	324	1096	323	16	1056	335	<b><u>1052</u></b>	<b><u>337</u></b>	1050	337
471.omnetpp	16	767	130	<b><u>767</u></b>	<b><u>130</u></b>	767	130	16	767	130	<b><u>767</u></b>	<b><u>130</u></b>	767	130
473.astar	16	<b><u>799</u></b>	<b><u>141</u></b>	796	141	808	139	16	<b><u>738</u></b>	<b><u>152</u></b>	739	152	738	152
483.xalancbmk	16	628	176	<b><u>628</u></b>	<b><u>176</u></b>	629	176	16	514	215	513	215	<b><u>513</u></b>	<b><u>215</u></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

## Operating System Notes

The libhugetlbfs libraries were installed using the installation rpms that came with the distribution.

'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

## General Notes

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

HUGETLB\_MORECORE = "yes"

LD\_LIBRARY\_PATH = "/root/work/cpu2006v1.1/amd909gh-libs/64:/root/work/cpu2006v1.1/amd909gh-libs/32"



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## Base Compiler Invocation

C benchmarks:

pgcc

C++ benchmarks:

pgcpp

## 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:

-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mfprelaxed  
-Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic\_pgi

C++ benchmarks:

-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mfprelaxed  
--zc\_eh -Mipa=fast -Mipa=inline:10 -tp barcelona-32 -Bstatic\_pgi

## Base Other Flags

C benchmarks:

-Mipa=jobs:4

C++ benchmarks:

-Mipa=jobs:4

## Peak Compiler Invocation

C benchmarks (except as noted below):

pathcc

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## Peak Compiler Invocation (Continued)

456.hmmcr: pgcc

462.libquantum: pgcc

C++ benchmarks (except as noted below):

pgcpp

483.xalancbmk: pathCC

## Peak Portability Flags

400.perlbench: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_LINUX\_X64  
401.bzip2: -DSPEC\_CPU\_LP64  
445.gobmk: -DSPEC\_CPU\_LP64  
456.hmmcr: -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)  
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf\_x86\_64.xBDT(pass 2)  
-L/usr/lib64 -lhugetlbfs(pass 2) -Ofast -IPA:plimit=20000  
-IPA:field\_reorder=on -LNO:opt=0 -WOPT:if\_conv=0  
-CG:local\_sched\_alg=1

401.bzip2: -march=barcelona -O3 -OPT:alias=disjoint -OPT:Ofast  
-OPT:goto=off -INLINE:aggressive=on -CG:local\_sched\_alg=1  
-m3dnow  
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf\_x86\_64.xBDT  
-L/usr/lib64 -lhugetlbfs

403.gcc: -march=barcelona -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -OPT:malloc\_alg=1  
-LNO:trip\_count=256 -LNO:prefetch\_ahead=10  
-CG:prefer\_lru\_reg=off -m32

429.mcf: -march=barcelona -O3 -ipa -INLINE:aggressive=on  
-CG:gcm=off -GRA:prioritize\_by\_density=on -m32  
-L/usr/lib -lhugetlbfs

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## Peak Optimization Flags (Continued)

445.gobmk: -march=barcelona -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2)  
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf\_x86\_64.xBDT(pass 2)  
-L/usr/lib64 -lhugetlbfs(pass 2) -O3 -OPT:alias=restrict  
-LNO:prefetch=1 -LNO:ignore\_feedback=off -CG:p2align=on

456.hmmcr: -Mvect=cachesize:6291456 -fastsse -Mvect=partial  
-Munroll=n:8 -Msmartalloc=huge -Msafeptr -Mprefetch=t0  
-Mfprelaxed -Mipa=const -Mipa=ptr -Mipa=arg -Mipa=inline  
-tp barcelona-64 -Bstatic\_pgi

458.sjeng: -march=barcelona -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2)  
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf\_x86\_64.xBDT(pass 2)  
-L/usr/lib64 -lhugetlbfs(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

462.libquantum: -Mvect=cachesize:6291456 -fastsse -Munroll=m:8  
-Msmartalloc=huge -Mprefetch=distance:4 -Mfprelaxed  
-Mipa=fast -Mipa=inline -Mipa=noarg -tp barcelona-64  
-Bstatic\_pgi

464.h264ref: -march=barcelona -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2)  
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf\_x86\_64.xBDT(pass 2)  
-L/usr/lib64 -lhugetlbfs(pass 2) -O3 -IPA:plimit=20000  
-OPT:alias=disjoint -LNO:prefetch=0 -CG:ptr\_load\_use=0  
-CG:push\_pop\_int\_saved\_regs=off -CG:prefer\_lru\_reg=off

C++ benchmarks:

471.omnetpp: basepeak = yes

473.astar: -Mphi(pass 1) -Mphi(pass 2) -Mipa=fast(pass 2)  
-Mipa=inline:6(pass 2) -Mvect=cachesize:6291456 -fastsse  
-O4 -Msmartalloc=huge -Msafeptr=global -Mfprelaxed  
--zc\_eh -tp barcelona-32 -Bstatic\_pgi

483.xalancbmk: -march=barcelona -Ofast -INLINE:aggressive=on -m32  
-L/root/work/libraries/SmartHeap\_8.1/lib -lsmarheap

## Peak Other Flags

C benchmarks:

Continued on next page



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## Peak Other Flags (Continued)

456.hmmmer: -Mipa=jobs:4

462.libquantum: -Mipa=jobs:4

C++ benchmarks (except as noted below):  
-Mipa=jobs:4(pass 2)

483.xalancbmk: No flags used

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

[http://www.spec.org/cpu2006/flags/pgi72\\_linux\\_flags.html](http://www.spec.org/cpu2006/flags/pgi72_linux_flags.html)  
[http://www.spec.org/cpu2006/flags/CPU2006\\_flags.20090710.html](http://www.spec.org/cpu2006/flags/CPU2006_flags.20090710.html)  
<http://www.spec.org/cpu2006/flags/amd-platform-amd909gh.html>

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

[http://www.spec.org/cpu2006/flags/pgi72\\_linux\\_flags.xml](http://www.spec.org/cpu2006/flags/pgi72_linux_flags.xml)  
[http://www.spec.org/cpu2006/flags/CPU2006\\_flags.20090710.xml](http://www.spec.org/cpu2006/flags/CPU2006_flags.20090710.xml)  
<http://www.spec.org/cpu2006/flags/amd-platform-amd909gh.xml>

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