



# SPEC® CINT2006 Result

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## Tyan

(Test Sponsor: Advanced Micro Devices)

Tyan YR190B8228,  
AMD Opteron 4176 HE

**SPECint®2006 = 22.3**

**SPECint\_base2006 = 18.4**

CPU2006 license: 49

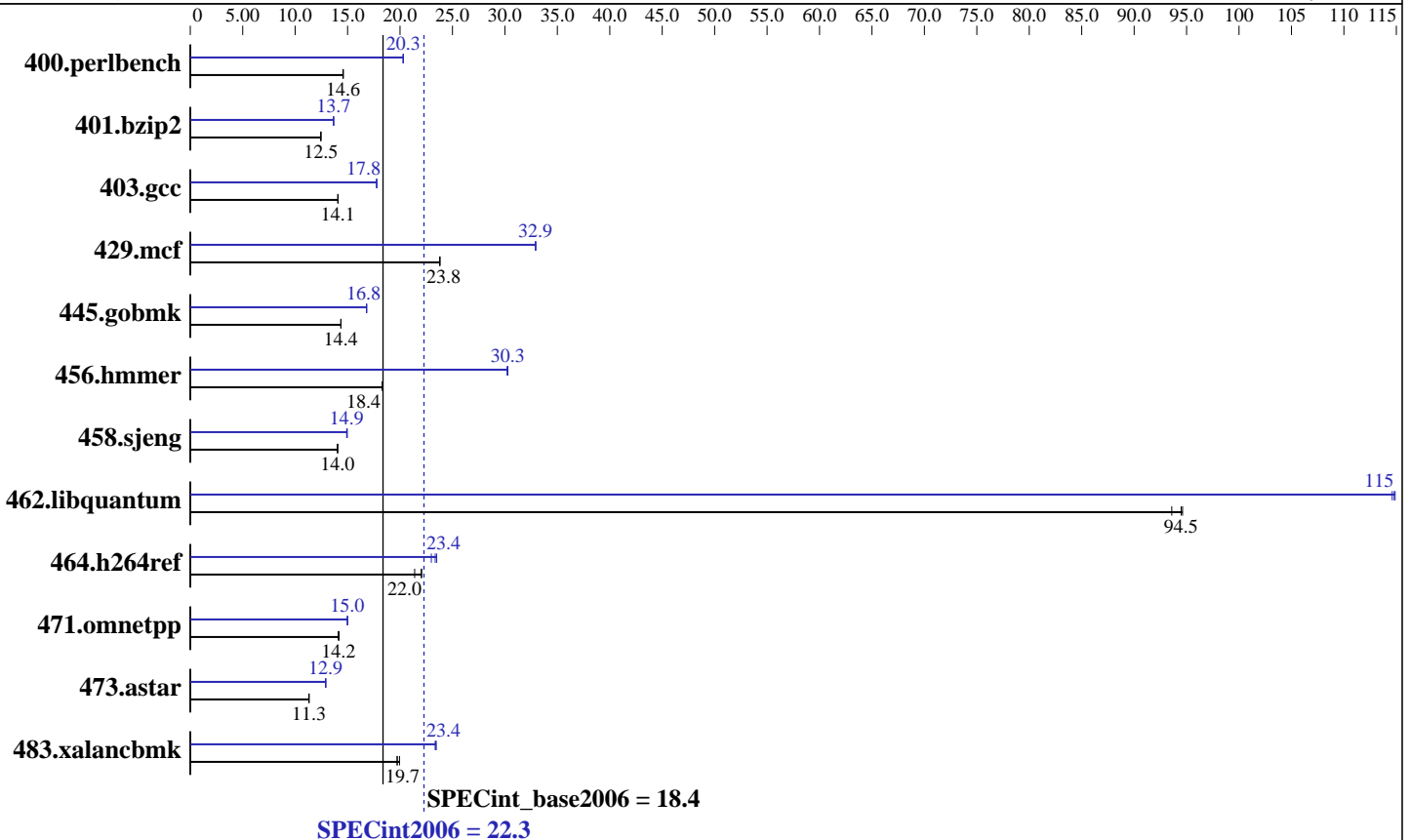
Test sponsor: Advanced Micro Devices

Tested by: Advanced Micro Devices

Test date: Nov-2010

Hardware Availability: Aug-2010

Software Availability: May-2010



### Hardware

CPU Name: AMD Opteron 4176 HE  
 CPU Characteristics:  
 CPU MHz: 2400  
 FPU: Integrated  
 CPU(s) enabled: 6 cores, 1 chip, 6 cores/chip  
 CPU(s) orderable: 1,2 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: 16 GB (2 x 8 GB 2Rx4 PC3-10600R-9, ECC)  
 Disk Subsystem: 1 x 128 GB SATA SSD  
 Crucial RealSSD C300 CTFDDAC128MAG-1G1  
 Other Hardware: None

### Software

Operating System: SUSE Linux Enterprise Server 11 (x86\_64),  
 Kernel 2.6.27.19-5-default  
 Compiler: x86 Open64 4.2.3.2 Compiler Suite (from AMD)  
 Auto Parallel: Yes  
 File System: ext3  
 System State: Run level 3 (Full multiuser with network)  
 Base Pointers: 32/64-bit  
 Peak Pointers: 32/64-bit  
 Other Software: SmartHeap 8.1 32-bit Library for Linux



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## Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	670	14.6	<b>670</b>	<b>14.6</b>	671	14.6	<b>481</b>	<b>20.3</b>	481	20.3	482	20.3
401.bzip2	775	12.5	<b>775</b>	<b>12.5</b>	776	12.4	706	13.7	<b>706</b>	<b>13.7</b>	706	13.7
403.gcc	572	14.1	572	14.1	<b>572</b>	<b>14.1</b>	453	17.8	453	17.8	<b>453</b>	<b>17.8</b>
429.mcf	<b>383</b>	<b>23.8</b>	384	23.8	383	23.8	277	32.9	277	32.9	<b>277</b>	<b>32.9</b>
445.gobmk	<b>730</b>	<b>14.4</b>	730	14.4	730	14.4	<b>624</b>	<b>16.8</b>	624	16.8	624	16.8
456.hammer	<b>508</b>	<b>18.4</b>	510	18.3	508	18.4	308	30.3	<b>308</b>	<b>30.3</b>	309	30.2
458.sjeng	861	14.1	<b>862</b>	<b>14.0</b>	862	14.0	811	14.9	<b>811</b>	<b>14.9</b>	808	15.0
462.libquantum	219	94.6	221	93.6	<b>219</b>	<b>94.5</b>	180	115	181	115	<b>180</b>	<b>115</b>
464.h264ref	1003	22.1	<b>1005</b>	<b>22.0</b>	1034	21.4	<b>948</b>	<b>23.4</b>	942	23.5	963	23.0
471.omnetpp	441	14.2	<b>441</b>	<b>14.2</b>	443	14.1	417	15.0	417	15.0	<b>417</b>	<b>15.0</b>
473.astar	620	11.3	621	11.3	<b>620</b>	<b>11.3</b>	544	12.9	543	12.9	<b>544</b>	<b>12.9</b>
483.xalancbmk	350	19.7	<b>350</b>	<b>19.7</b>	346	20.0	295	23.4	<b>295</b>	<b>23.4</b>	294	23.4

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=1000 in /etc/sysctl.conf  
mount -t hugetlbfs nodev /mnt/hugepages

powersave -f was used to set the CPU frequency to its maximum.

Binaries were compiled on SLES10 SP2 with binutils 2.18

## General Notes

Environment variables set by runspec before the start of the run:  
LD\_LIBRARY\_PATH = "/root/work/cpu2006/amd1002-speed-libs-revA/64:/root/work/cpu2006/amd1002-speed-libs-revA/32"  
O64\_OMP\_AFFINITY\_MAP = "0,1,2,3,4,5"  
O64\_OMP\_SPIN\_USER\_LOCK = "true"

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



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## 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 -apo -CG:local\_sched\_alg=1  
-HP:bdt=2m:heap=2m,limit=450 -LNO:parallel\_overhead=10000

C++ benchmarks:  
-march=barcelona -Ofast -m32 -INLINE:aggressive=on -CG:cmp\_peep=on  
-L/root/work/libraries/SmartHeap-8.1/lib -lsmarheap

## Peak Compiler Invocation

C benchmarks:  
openc

C++ benchmarks:  
openCC

## Peak Portability Flags

400.perlbench: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_LINUX\_X64  
401.bzip2: -DSPEC\_CPU\_LP64

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## Peak Portability Flags (Continued)

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:bd=2m:heap=2m

401.bzip2: -march=barcelona -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -O3 -OPT:alias=disjoint  
-OPT:goto=off -CG:local\_sched\_alg=1 -HP:bd=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:bd=2m:heap=2m -GRA:unspill=on -IPA:small\_pu=200

429.mcf: -march=barcelona -O3 -ipa -INLINE:aggressive=on  
-CG:gcm=off -GRA:prioritize\_by\_density=on -m32  
-HP:bd=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:bd=2m:heap=2m

456.hmmer: -march=barcelona -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -LNO:prefetch=0  
-OPT:alias=disjoint -OPT:unroll\_times\_max=8  
-OPT:unroll\_size=256 -OPT:unroll\_level=2 -OPT:keep\_ext=on  
-CG:local\_sched\_alg=1 -CG:cflow=0  
-CG:push\_pop\_int\_saved\_regs=off -CG:cmp\_peep=on  
-HP:bd=2m:heap=2m

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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 -IPA:min\_hotness=32 -CG:ptr\_load\_use=0  
-OPT:unroll\_times\_max=8 -INLINE:aggressive=on  
-HP:bdt=2m:heap=2m

462.libquantum: -march=barcelona -Ofast -apo -LNO:pf2=0 -CG:gcm=off  
-CG:use\_prefetchnta=on -CG:cmp\_peep=on -WOPT:aggstr=0  
-OPT:alias=disjoint -INLINE:aggressive=on -IPA:space=1000  
-IPA:plimit=20000 -mso

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  
-WOPT:if\_conv=0 -m32 -HP:bdt=2m:heap=2m

473.astar: -march=barcelona -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -TENV:frame\_pointer=off  
-WOPT:if\_conv=0 -GRA:optimize\_boundary=on  
-OPT:alias=disjoint -INLINE:aggressive=on  
-IPA:small\_pu=3000 -IPA:plimit=3000 -m32  
-HP:bdt=2m:heap=2m

483.xalancbmk: -march=barcelona -Ofast -INLINE:aggressive=on -m32  
-CG:cmp\_peep=on -GRA:unspill=on -TENV:frame\_pointer=off  
-fno-emit-exceptions  
-L/root/work/libraries/SmartHeap-8.1/lib -lsmarheap

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

<http://www.spec.org/cpu2006/flags/x86-open64-423-flags-speed-revA.20101207.html>

<http://www.spec.org/cpu2006/flags/amd-platform-speed-revA.html>

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

<http://www.spec.org/cpu2006/flags/x86-open64-423-flags-speed-revA.20101207.xml>

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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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