



# SPEC® CINT2006 Result

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## Supermicro

Supermicro A+ Server 2022G-URF, AMD Opteron 6176 SE

SPECint®2006 = 21.4

SPECint\_base2006 = 16.7

CPU2006 license: 001176

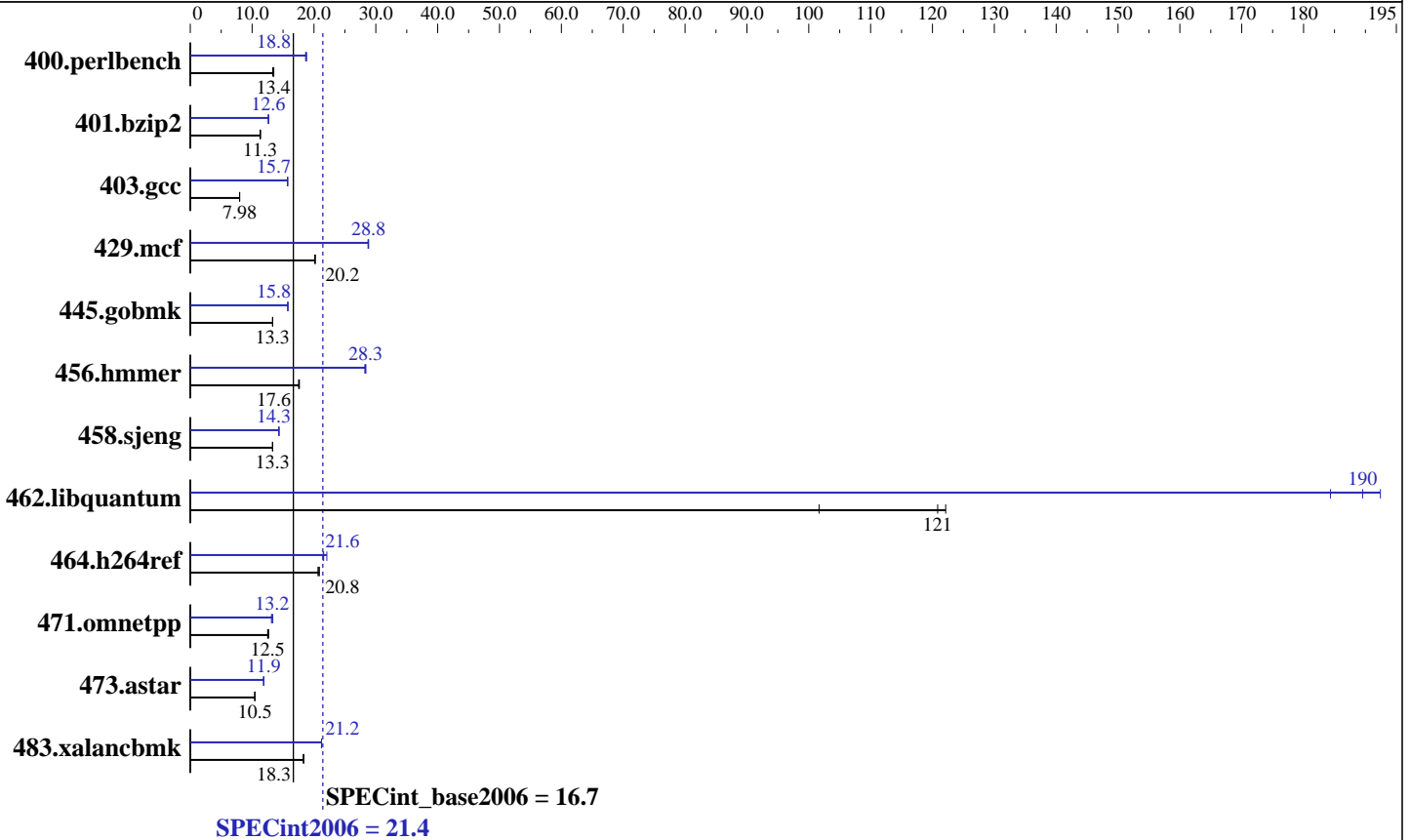
Test sponsor: Supermicro

Tested by: Supermicro

Test date: Nov-2010

Hardware Availability: Mar-2010

Software Availability: May-2010



### Hardware

CPU Name: AMD Opteron 6176 SE  
 CPU Characteristics:  
 CPU MHz: 2300  
 FPU: Integrated  
 CPU(s) enabled: 24 cores, 2 chips, 12 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: 12 MB I+D on chip per chip, 6 MB shared / 6 cores  
 Other Cache: None  
 Memory: 64 GB (16 x 4 GB 2Rx4 PC3-10600R-9, ECC)  
 Disk Subsystem: 1 x 500 GB SATA, 7200 RPM  
 Other Hardware: None

### Software

Operating System: Red Hat Enterprise Linux Server release 5.5, Kernel 2.6.18-194.el5  
 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: binutils 2.18, 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	<b><u>727</u></b>	<b><u>13.4</u></b>	723	13.5	733	13.3	<b><u>521</u></b>	<b><u>18.8</u></b>	520	18.8	524	18.6
401.bzip2	853	11.3	<b><u>853</u></b>	<b><u>11.3</u></b>	850	11.4	<b><u>763</u></b>	<b><u>12.6</u></b>	765	12.6	763	12.7
403.gcc	1009	7.98	1010	7.97	<b><u>1009</u></b>	<b><u>7.98</u></b>	511	15.8	<b><u>512</u></b>	<b><u>15.7</u></b>	512	15.7
429.mcf	451	20.2	453	20.1	<b><u>452</u></b>	<b><u>20.2</u></b>	317	28.7	316	28.8	<b><u>317</u></b>	<b><u>28.8</u></b>
445.gobmk	787	13.3	789	13.3	<b><u>787</u></b>	<b><u>13.3</u></b>	665	15.8	665	15.8	<b><u>665</u></b>	<b><u>15.8</u></b>
456.hammer	529	17.6	532	17.5	<b><u>531</u></b>	<b><u>17.6</u></b>	329	28.4	331	28.2	<b><u>329</u></b>	<b><u>28.3</u></b>
458.sjeng	909	13.3	<b><u>909</u></b>	<b><u>13.3</u></b>	910	13.3	<b><u>844</u></b>	<b><u>14.3</u></b>	845	14.3	844	14.3
462.libquantum	<b><u>171</u></b>	<b><u>121</u></b>	204	102	170	122	<b><u>109</u></b>	<b><u>190</u></b>	112	184	108	192
464.h264ref	1060	20.9	1072	20.6	<b><u>1065</u></b>	<b><u>20.8</u></b>	<b><u>1026</u></b>	<b><u>21.6</u></b>	1002	22.1	1029	21.5
471.omnetpp	493	12.7	499	12.5	<b><u>499</u></b>	<b><u>12.5</u></b>	<b><u>472</u></b>	<b><u>13.2</u></b>	468	13.3	476	13.1
473.astar	671	10.5	<b><u>671</u></b>	<b><u>10.5</u></b>	674	10.4	<b><u>591</u></b>	<b><u>11.9</u></b>	593	11.8	590	11.9
483.xalancbmk	376	18.3	<b><u>376</u></b>	<b><u>18.3</u></b>	378	18.3	325	21.2	325	21.2	<b><u>325</u></b>	<b><u>21.2</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.  
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=4000 in /etc/sysctl.conf  
mount -t hugetlbfs nodev /mnt/hugepages

cpuspeed stop was used to set the CPU frequency to its maximum.

## General Notes

Environment variables set by runspec before the start of the run:  
LD\_LIBRARY\_PATH = "/usr/cpu2006/amd1002-speed-libs-revA/64:/usr/cpu2006/amd1002-speed-libs-revA/32"  
O64\_OMP\_AFFINITY\_MAP = "0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23"  
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:bdt=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: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 -IPA:small\_pu=200

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: -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:bdt=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>

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



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

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