



# SPEC® CINT2006 Result

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## Supermicro

Supermicro A+ Server, 1022G-URF  
AMD Opteron 6276

SPECint®\_rate2006 = 469

SPECint\_rate\_base2006 = 419

CPU2006 license: 001176

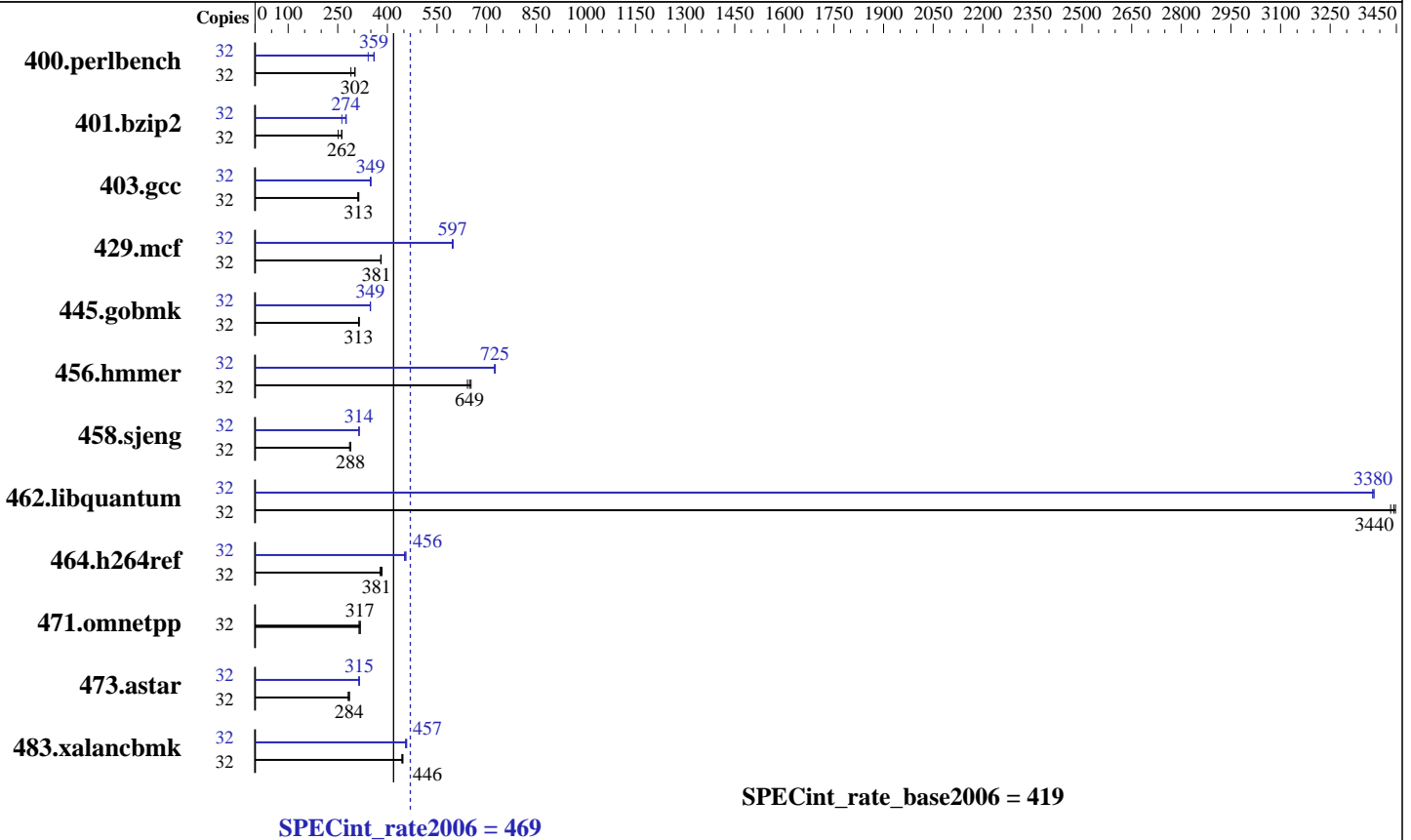
Test sponsor: Supermicro

Tested by: Supermicro

Test date: Mar-2012

Hardware Availability: Nov-2011

Software Availability: Dec-2011



### Hardware

CPU Name: AMD Opteron 6276  
 CPU Characteristics: AMD Turbo CORE technology up to 3.20 GHz  
 CPU MHz: 2300  
 FPU: Integrated  
 CPU(s) enabled: 32 cores, 2 chips, 16 cores/chip  
 CPU(s) orderable: 1,2 chips  
 Primary Cache: 512 KB I on chip per chip,  
64 KB I shared / 2 cores;  
16 KB D on chip per core  
 Secondary Cache: 16 MB I+D on chip per chip, 2 MB shared / 2 cores  
 L3 Cache: 16 MB I+D on chip per chip, 8 MB shared / 8 cores  
 Other Cache: None  
 Memory: 128 GB (16 x 8 GB 2Rx4 PC3-12800R-11, ECC)  
 Disk Subsystem: 1 x 500 GB SATA, 7200 RPM  
 Other Hardware: None

### Software

Operating System: Red Hat Enterprise Linux Server release 6.2,  
Kernel 2.6.32-220.el6.x86\_64  
 Compiler: C/C++: Version 4.5.1 of x86 Open64 Compiler Suite  
(from AMD)  
 Auto Parallel: No  
 File System: ext3  
 System State: Run level 3 (multi-user)  
 Base Pointers: 32/64-bit  
 Peak Pointers: 32/64-bit  
 Other Software: SmartHeap 10.0 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	32	1035	302	1079	290	<b>1036</b>	<b>302</b>	32	914	342	<b>871</b>	<b>359</b>	868	360
401.bzip2	32	<b>1181</b>	<b>262</b>	1228	251	1176	263	32	1177	262	<b>1126</b>	<b>274</b>	1120	276
403.gcc	32	<b>823</b>	<b>313</b>	830	311	821	314	32	735	351	<b>738</b>	<b>349</b>	739	348
429.mcf	32	768	380	<b>767</b>	<b>381</b>	765	381	32	490	596	<b>489</b>	<b>597</b>	487	599
445.gobmk	32	1073	313	1064	315	<b>1072</b>	<b>313</b>	32	961	349	<b>963</b>	<b>349</b>	964	348
456.hammer	32	<b>460</b>	<b>649</b>	457	653	465	642	32	412	724	411	726	<b>412</b>	<b>725</b>
458.sjeng	32	<b>1343</b>	<b>288</b>	1356	286	1339	289	32	<b>1232</b>	<b>314</b>	1231	315	1233	314
462.libquantum	32	193	3430	<b>193</b>	<b>3440</b>	192	3450	32	196	3380	196	3380	<b>196</b>	<b>3380</b>
464.h264ref	32	<b>1858</b>	<b>381</b>	1872	378	1845	384	32	1554	456	<b>1554</b>	<b>456</b>	1567	452
471.omnetpp	32	<b>631</b>	<b>317</b>	629	318	637	314	32	<b>631</b>	<b>317</b>	629	318	637	314
473.astar	32	<b>791</b>	<b>284</b>	799	281	787	285	32	713	315	716	314	<b>713</b>	<b>315</b>
483.xalancbmk	32	498	444	<b>495</b>	<b>446</b>	494	447	32	482	458	485	455	<b>483</b>	<b>457</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 transparent\_hugepage=never as a boot parameter in /boot/grub/menu.lst

Set vm/nr\_hugepages=28672 in /etc/sysctl.conf  
mount -t hugetlbfs nodev /mnt/hugepages

## Platform Notes

Fan speed set to Full Speed in BIOS setup.  
PowerNow and C1E set to disabled in BIOS setup.

## General Notes

As tested, the system used a Supermicro H8DGU-F motherboard.  
Environment variables set by runspec before the start of the run:  
HUGETLB\_LIMIT = "896"  
LD\_LIBRARY\_PATH = "/home/spec/amd1104-rate-libs-revC/32:/home/spec/amd1104-rate-libs-revC/64"

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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>

Binaries were compiled on a system with 2x AMD Opteron 6274 chips + 64GB Memory using RHEL 6.1

## 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=bdver1 -Ofast -CG:local\_sched\_alg=1 -INLINE:aggressive=ON  
-IPA:plimit=8000 -IPA:small\_pu=100 -HP:bd=2m:heap=2m -mso  
-LNO:prefetch=2

C++ benchmarks:  
-march=bdver1 -Ofast -m32 -INLINE:aggressive=on -CG:cmp\_peep=on  
-D\_\_OPEN64\_FAST\_SET -L/root/work/libraries/SmartHeap-10/lib -lsmartheap

## Peak Compiler Invocation

C benchmarks:  
openc

C++ benchmarks:  
openCC



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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=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -LNO:prefetch=2 -LNO:opt=0  
-IPA:plimit=20000 -OPT:unroll\_times\_max=8  
-OPT:unroll\_size=256 -OPT:unroll\_level=2 -OPT:keep\_ext=on  
-WOPT:if\_conv=0 -WOPT:sib=on -CG:local\_sched\_alg=1  
-CG:unroll\_fb\_req=on -CG:movext\_icmp=off -HP:bd=2m:heap=2m

401.bzip2: -march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -O3 -LNO:prefetch=2 -LNO:pf2=0  
-OPT:alias=disjoint -OPT:goto=off -CG:local\_sched\_alg=1  
-HP:bd=2m:heap=2m

403.gcc: -march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -LNO:trip\_count=256  
-CG:cmp\_peep=on -CG:pre\_minreg\_level=2 -m32  
-HP:bd=2m:heap=2m -GRA:unspill=on -IPA:small\_pu=200  
-WOPT:sib=on

429.mcf: -march=bdver1 -O3 -OPT:unroll\_times\_max=5 -ipa  
-INLINE:aggressive=on -CG:gcm=off -CG:dsched=on  
-GRA:prioritize\_by\_density=on -m32 -HP:bd=2m:heap=2m -mso

445.gobmk: -march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -OPT:unroll\_size=256  
-OPT:unroll\_times\_max=8 -OPT:keep\_ext=on -IPA:plimit=750  
-IPA:min\_hotness=300 -IPA:pu\_reorder=1  
-LNO:ignore\_feedback=off -WOPT:if\_conv=2 -HP:bd=2m:heap=2m

456.hmmer: -march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -LNO:prefetch=2  
-OPT:alias=disjoint -OPT:unroll\_times\_max=16  
-OPT:unroll\_size=512 -OPT:unroll\_level=2 -OPT:keep\_ext=on  
-CG:cflow=0 -CG:cmp\_peep=on -CG:pre\_local\_sched=off  
-HP:bd=2m:heap=2m

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## Peak Optimization Flags (Continued)

458.sjeng: -march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -CG:ptr\_load\_use=0  
-CG:divrem\_opt=on -CG:movext\_icmp=off -CG:locs\_best=on  
-LNO:full\_unroll=10 -IPA:pu\_reorder=2 -HP:heap=2m:bd=2m  
-WOPT:sib=on

462.libquantum: -march=bdver1 -Ofast -mso -OPT:unroll\_size=512  
-OPT:unroll\_times\_max=16 -LNO:prefetch=2  
-LNO:prefetch\_ahead=4 -LNO:pf2=0 -CG:local\_sched\_alg=1  
-CG:p2align=0 -INLINE:aggressive=ON -IPA:plimit=15000  
-IPA:small\_pu=100 -HP:bdt=2m:heap=2m,limit=300

464.h264ref: -march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -O3 -OPT:unroll\_size=256  
-OPT:unroll\_times\_max=2 -IPA:plimit=20000  
-OPT:alias=disjoint -CG:ptr\_load\_use=0  
-CG:local\_sched\_alg=1 -HP:bdt=2m:heap=2m

C++ benchmarks:

471.omnetpp: basepeak = yes

473.astar: -march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -TENV:frame\_pointer=off  
-WOPT:if\_conv=0 -WOPT:sib=on -CG:divrem\_opt=on  
-CG:p2align=1 -CG:dsched=on -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=bdver1 -Ofast -LNO:prefetch=2 -OPT:unroll\_size=512  
-OPT:unroll\_times\_max=8 -D\_\_OPEN64\_FAST\_SET  
-INLINE:aggressive=on -m32 -CG:cmp\_peep=on  
-CG:local\_sched=off -CG:p2align=1 -GRA:unspill=on  
-TENV:frame\_pointer=off -fno-emit-exceptions  
-L/root/work/libraries/SmartHeap-10/lib -lsmartheap

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

<http://www.spec.org/cpu2006/flags/x86-open64-451-flags-rate-revC-I.html>

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

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

<http://www.spec.org/cpu2006/flags/x86-open64-451-flags-rate-revC-I.xml>

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



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

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