



# SPEC® CINT2006 Result

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## Supermicro

Supermicro A+ Server AS-2042G-72RF4, (H8QG7-LN4F,  
Opteron 6338P)  
AMD Opteron 6338P

SPECint®\_rate2006 = 777

SPECint\_rate\_base2006 = 698

CPU2006 license: 001176

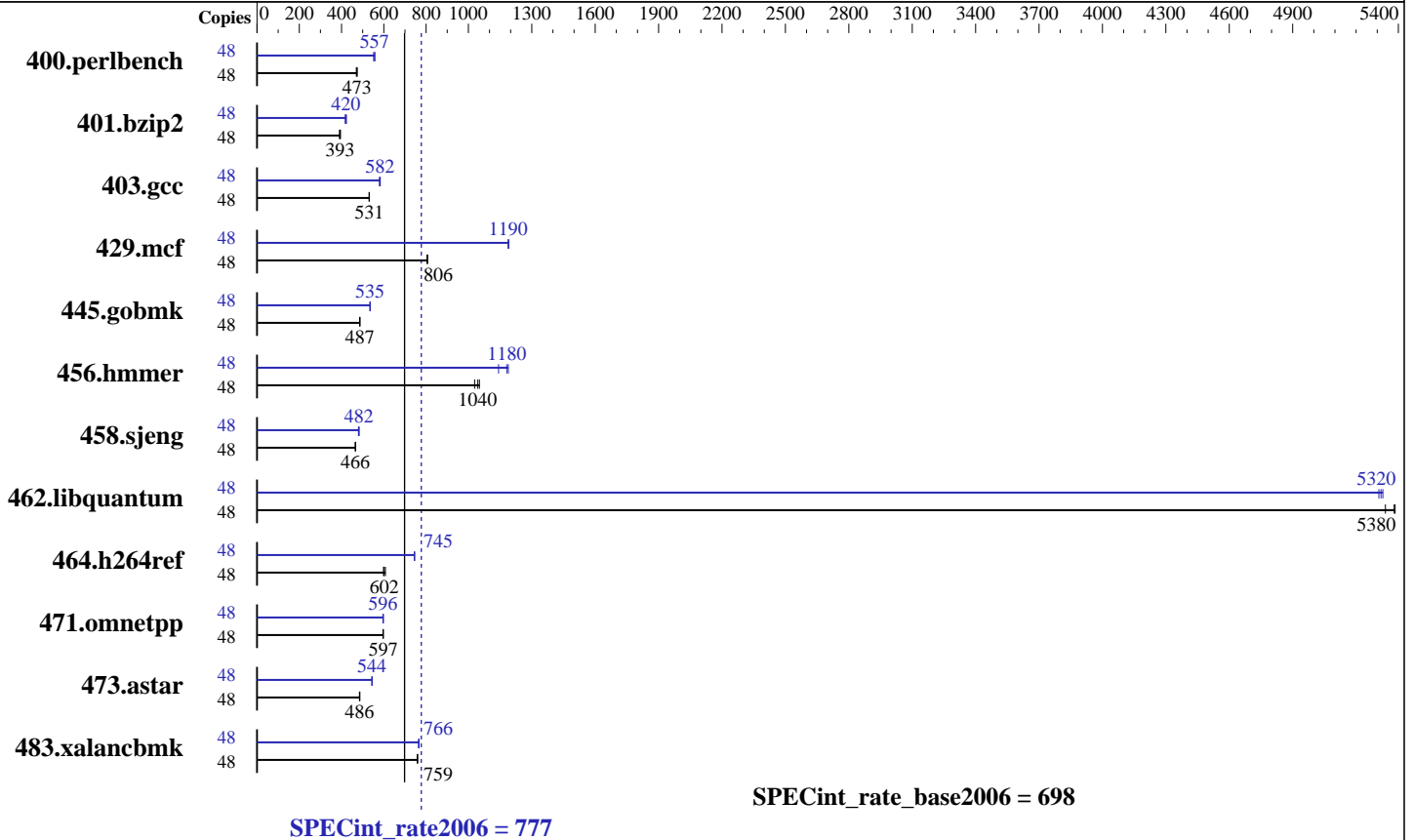
Test sponsor: Supermicro

Tested by: Supermicro

Test date: Oct-2013

Hardware Availability: Jan-2014

Software Availability: Aug-2012



### Hardware

CPU Name: AMD Opteron 6338P  
 CPU Characteristics: AMD Turbo CORE technology up to 2.80 GHz  
 CPU MHz: 2300  
 FPU: Integrated  
 CPU(s) enabled: 48 cores, 4 chips, 12 cores/chip  
 CPU(s) orderable: 2,4 chips  
 Primary Cache: 384 KB I on chip per chip,  
 64 KB I shared / 2 cores;  
 16 KB D on chip per core  
 Secondary Cache: 12 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 / 6 cores  
 Other Cache: None  
 Memory: 256 GB (32 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 6.4,  
 Kernel 2.6.32-358.el6.x86\_64  
 Compiler: C/C++: Version 4.5.2 of x86 Open64 Compiler Suite  
 (from AMD)  
 Auto Parallel: No  
 File System: ext4  
 System State: Run level 3 (Full multiuser with network)  
 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  | 48     | 990        | 474        | 998         | 470         | <u>992</u>  | <u>473</u> | 48     | 841        | 557        | 850         | 552         | <u>843</u>  | <u>557</u>  |
| 401.bzip2      | 48     | 1188       | 390        | 1174        | 395         | <u>1178</u> | <u>393</u> | 48     | 1095       | 423        | <u>1102</u> | <u>420</u>  | 1110        | 417         |
| 403.gcc        | 48     | 728        | 530        | <u>728</u>  | <u>531</u>  | 727         | 532        | 48     | 663        | 583        | <u>664</u>  | <u>582</u>  | 667         | 579         |
| 429.mcf        | 48     | <u>543</u> | <u>806</u> | 544         | 805         | 543         | 806        | 48     | 368        | 1190       | 368         | 1190        | <u>368</u>  | <u>1190</u> |
| 445.gobmk      | 48     | 1036       | 486        | 1035        | 487         | <u>1035</u> | <u>487</u> | 48     | <u>941</u> | <u>535</u> | 941         | 535         | 942         | 535         |
| 456.hammer     | 48     | 426        | 1050       | <u>429</u>  | <u>1040</u> | 435         | 1030       | 48     | 392        | 1140       | <u>379</u>  | <u>1180</u> | 377         | 1190        |
| 458.sjeng      | 48     | 1246       | 466        | <u>1247</u> | <u>466</u>  | 1248        | 465        | 48     | 1210       | 480        | 1202        | 483         | <u>1205</u> | <u>482</u>  |
| 462.libquantum | 48     | 185        | 5380       | <u>185</u>  | <u>5380</u> | 186         | 5340       | 48     | 187        | 5310       | <u>187</u>  | <u>5320</u> | 187         | 5330        |
| 464.h264ref    | 48     | 1748       | 608        | <u>1765</u> | <u>602</u>  | 1775        | 598        | 48     | 1425       | 745        | 1427        | 745         | <u>1426</u> | <u>745</u>  |
| 471.omnetpp    | 48     | 503        | 596        | <u>502</u>  | <u>597</u>  | 502         | 597        | 48     | 501        | 598        | <u>503</u>  | <u>596</u>  | 504         | 596         |
| 473.astar      | 48     | <u>693</u> | <u>486</u> | 696         | 484         | 693         | 486        | 48     | 620        | 544        | <u>619</u>  | <u>544</u>  | 619         | 545         |
| 483.xalancbmk  | 48     | <u>437</u> | <u>759</u> | 437         | 758         | 436         | 760        | 48     | 432        | 767        | <u>433</u>  | <u>766</u>  | 433         | 764         |

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=43008 in /etc/sysctl.conf  
mount -t hugetlbfs nodev /mnt/hugepages

## Platform Notes

C State mode set to disabled under Processor & Clock Options in BIOS.  
HPC Mode set to enabled under Processor & Clock Options in BIOS.  
C1E Support set to disabled under Processor & Clock Options in BIOS.  
Power Down Enable set to disabled in Memory Configuration in BIOS.

## General Notes

Environment variables set by runspec before the start of the run:  
HUGETLB\_LIMIT = "896"  
LD\_LIBRARY\_PATH = "/home/spec/amd1206-rate-libs-revA/32:/home/spec/amd1206-rate-libs-revA/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 6386SE chips + 128GB Memory using RHEL 6.3

## 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.hmmr: -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:  
-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  
-march=bdver1

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

## Peak Compiler Invocation

C benchmarks:  
openc

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## Peak Compiler Invocation (Continued)

C++ benchmarks:  
openCC

## 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
473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LINUX
```

## Peak Optimization Flags

C benchmarks:

```
400.perlbench: -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 -march=bdver1
-GRA:aggr_loop_splitting=off -GRA:loop_splitting=off

401.bzip2: -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:bdt=2m:heap=2m
-march=bdver2

403.gcc: -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:bdt=2m:heap=2m -GRA:unspill=on -IPA:small_pu=200
-WOPT:sib=on -march=bdver2 -mno-fma4

429.mcf: -O3 -OPT:unroll_times_max=5 -ipa -INLINE:aggressive=on
-CG:gcm=off -CG:dsched=on -GRA:prioritize_by_density=on
-m32 -HP:bdt=2m:heap=2m -mso -march=bdver1

445.gobmk: -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 -march=bdver1
```

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## Peak Optimization Flags (Continued)

456.hmmer: -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:bdt=2m:heap=2m  
-CG:p2align=0 -CG:load\_exe=3 -CG:dsched=on -march=bdver1

458.sjeng: -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 -march=bdver1

462.libquantum: -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 -march=bdver2

464.h264ref: -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 -march=bdver1

C++ benchmarks:

471.omnetpp: -Ofast -m32 -INLINE:aggressive=on -CG:cmp\_peep=on  
-WOPT:sib=on -D\_\_OPEN64\_FAST\_SET -march=bdver2 -mno-fma4  
-L/root/work/libraries/SmartHeap-10/lib -lsmartheap

473.astar: -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -Ofast  
-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 -HP:bdt=2m:heap=2m  
-march=bdver1

483.xalancbmk: -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 -march=bdver2  
-mno-fma4  
-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-open64-452-flags-rate-revA-III.html>

<http://www.spec.org/cpu2006/flags/amd-Supermicro-platform-rate-revC-I.html>



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

<http://www.spec.org/cpu2006/flags/x86-open64-452-flags-rate-revA-III.xml>

<http://www.spec.org/cpu2006/flags/amd-Supermicro-platform-rate-revC-I.xml>

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

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