# SPEC® CINT2006 Result

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## Supermicro

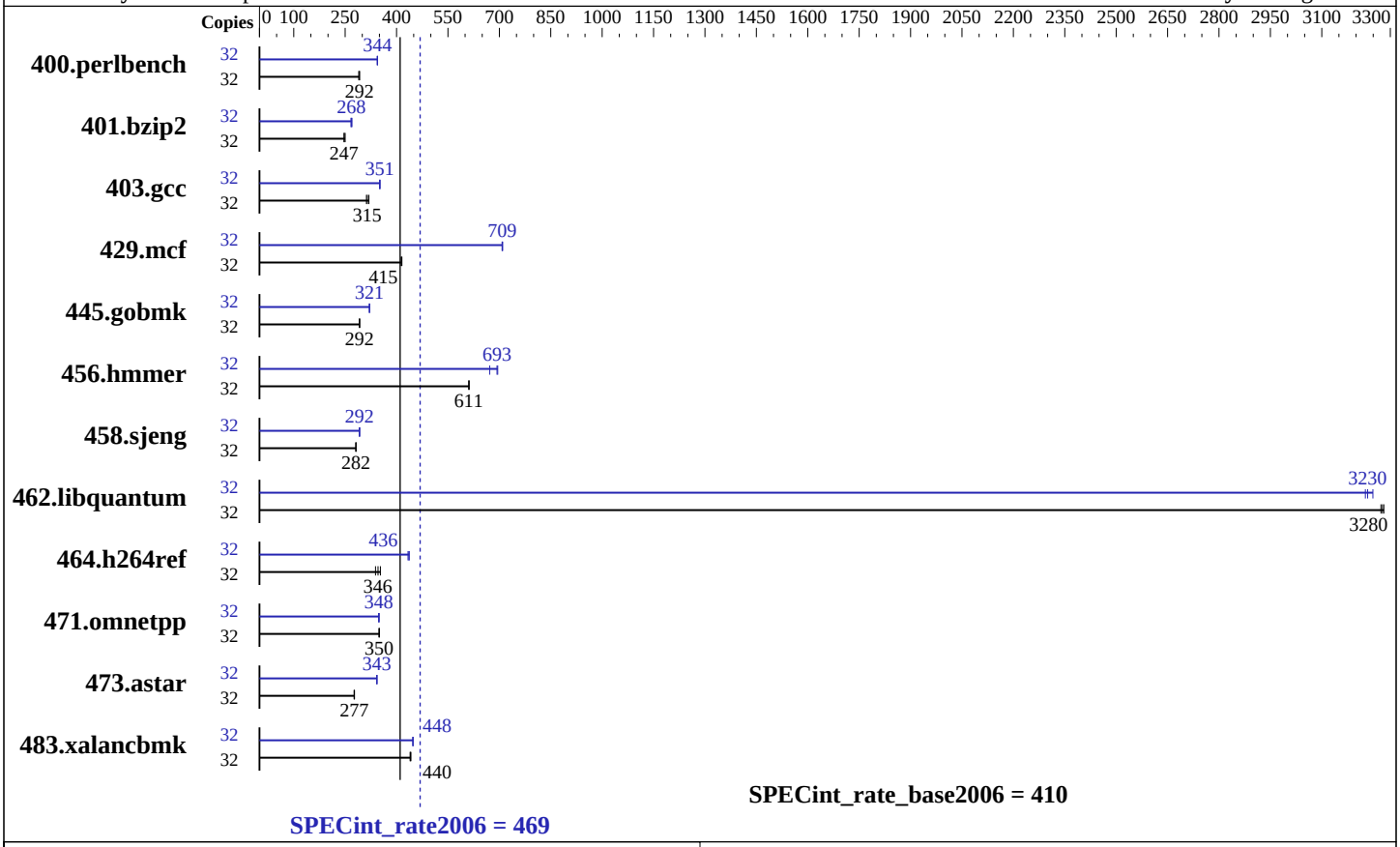
Supermicro A+ Server 2022G-URF
(H8DGU-F, AMD Opteron 6370P)

**SPECint®_rate2006 = 469**

**SPECint_rate_base2006 = 410**

**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 6370P |
| CPU Characteristics: | AMD Turbo CORE technology up to 2.50 GHz |
| CPU MHz: | 2000 |
| 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,<br>64 KB I shared / 2 cores;<br>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: | 256 GB (16 x 16 GB 2Rx4 PC3-12800R-11, ECC) |
| Disk Subsystem: | 1 x 500 GB SATAIII, 7200 RPM |
| Other Hardware: | None |

### Software

| | |
|---|---|
| Operating System: | CentOS 6.4,<br>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 | 32 | 1071 | 292 | **1072** | **292** | 1079 | 290 | 32 | **908** | **344** | 911 | 343 | 907 | 345 |
| 401.bzip2 | 32 | **1249** | **247** | 1235 | 250 | 1251 | 247 | 32 | 1156 | 267 | **1152** | **268** | 1144 | 270 |
| 403.gcc | 32 | 807 | 319 | **818** | **315** | 825 | 312 | 32 | 735 | 350 | 732 | 352 | **733** | **351** |
| 429.mcf | 32 | **704** | **415** | 706 | 413 | 702 | 416 | 32 | 411 | 710 | 412 | 708 | **412** | **709** |
| 445.gobmk | 32 | 1149 | 292 | **1149** | **292** | 1151 | 292 | 32 | 1046 | 321 | 1046 | 321 | **1046** | **321** |
| 456.hmmer | 32 | 488 | 612 | **489** | **611** | 489 | 611 | 32 | **431** | **693** | 429 | 695 | 444 | 672 |
| 458.sjeng | 32 | 1375 | 282 | 1376 | 281 | **1375** | **282** | 32 | **1325** | **292** | 1324 | 292 | 1330 | 291 |
| 462.libquantum | 32 | 203 | 3270 | **202** | **3280** | 202 | 3280 | 32 | 204 | 3250 | **205** | **3230** | 205 | 3230 |
| 464.h264ref | 32 | **2047** | **346** | 2007 | 353 | 2091 | 339 | 32 | 1634 | 433 | **1624** | **436** | 1621 | 437 |
| 471.omnetpp | 32 | 574 | 349 | **572** | **350** | 572 | 350 | 32 | **574** | **348** | 573 | 349 | 575 | 348 |
| 473.astar | 32 | **811** | **277** | 810 | 277 | 814 | 276 | 32 | **656** | **343** | 656 | 342 | 655 | 343 |
| 483.xalancbmk | 32 | 500 | 442 | 502 | 440 | **502** | **440** | 32 | **493** | **448** | 493 | 448 | 493 | 448 |

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
```

## General Notes

```
Environment variables set by runspec before the start of the run:
HUGETLB_LIMIT = "896"
LD_LIBRARY_PATH = "/home/cpu2006/amd1206-rate-libs-revA/32:/home/cpu2006/amd1206-rate-libs-revA/64"

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:
opencc

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:
-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 -lsmartheap

## Peak Compiler Invocation

C benchmarks:
opencc

C++ benchmarks:
openCC

## Peak Portability Flags

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64

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## Peak Portability Flags (Continued)

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

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

Continued on next page

# Peak Optimization Flags (Continued)

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/amd-Supermicro-platform-rate-revC-I.html
http://www.spec.org/cpu2006/flags/x86-open64-452-flags-rate-revA-III.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/amd-Supermicro-platform-rate-revC-I.xml
http://www.spec.org/cpu2006/flags/x86-open64-452-flags-rate-revA-III.xml

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