# SPEC® CINT2006 Result

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## Tyan

(Test Sponsor: Advanced Micro Devices)

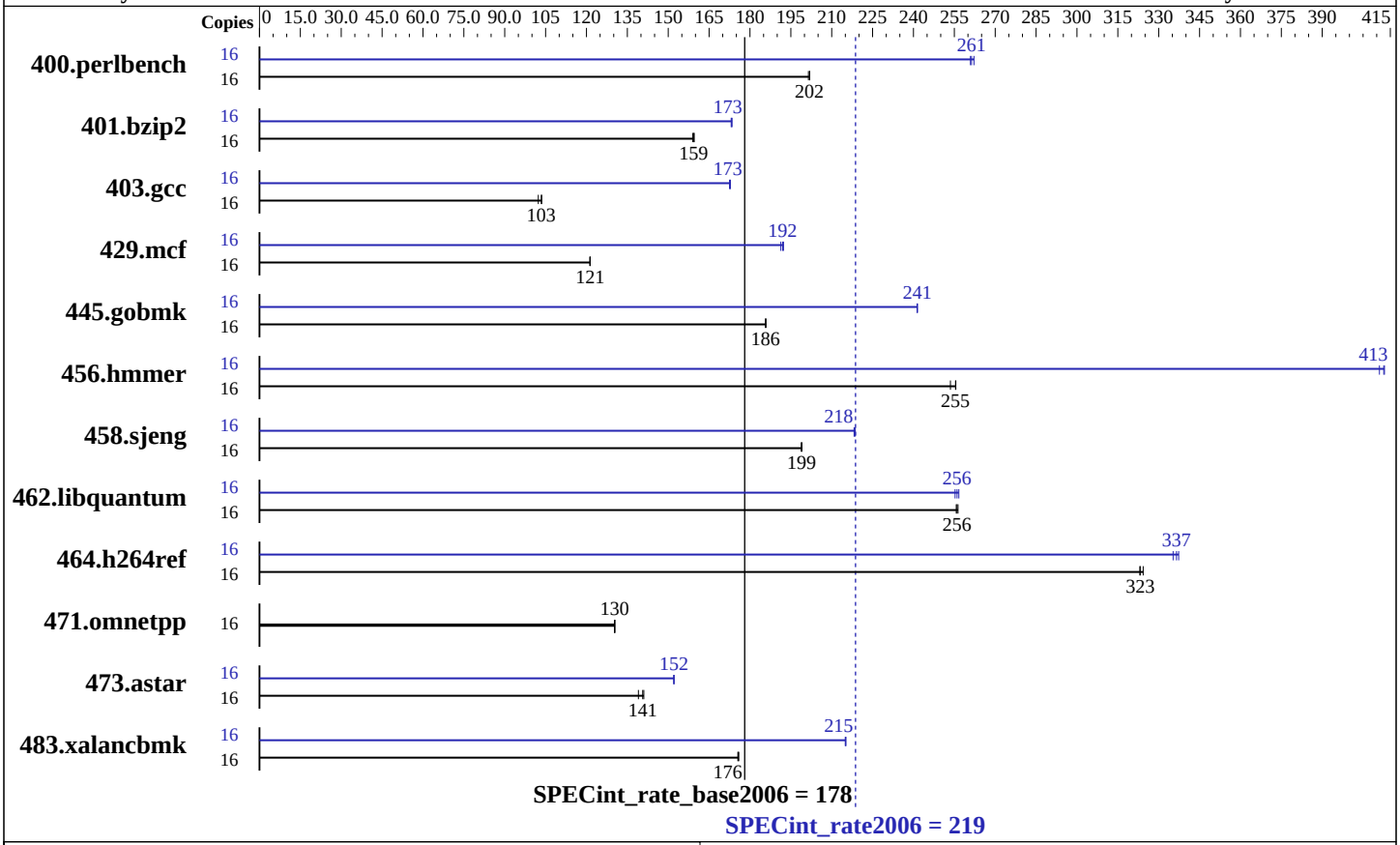
## Transport TX46, AMD Opteron 8376 HE

**SPECint®_rate2006 = 219**

**SPECint_rate_base2006 = 178**

**CPU2006 license:** 49
**Test sponsor:** Advanced Micro Devices
**Tested by:** Advanced Micro Devices

**Test date:** Nov-2008
**Hardware Availability:** Jan-2009
**Software Availability:** Jun-2008




## Hardware

| | |
|---|---|
| CPU Name: | AMD Opteron 8376 HE |
| CPU Characteristics: | |
| CPU MHz: | 2300 |
| FPU: | Integrated |
| CPU(s) enabled: | 16 cores, 4 chips, 4 cores/chip |
| CPU(s) orderable: | 2,4 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: | 64 GB (16x4 GB, DDR2-800, CL5, Reg, Dual Rank) |
| Disk Subsystem: | 1 x 250 GB SATA, 7200 RPM |
| Other Hardware: | None |

## Software

| | |
|---|---|
| Operating System: | Red Hat Enterprise Linux Server release 5.2, Advanced Platform, Kernel 2.6.18-92.el5 |
| Compiler: | PGI Server Complete Version 7.2<br>PathScale Compiler Suite Version 3.2 |
| Auto Parallel: | No |
| 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<br>32-bit and 64-bit libhugetlbfs libraries<br>SmartHeap 8.1 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 | 16 | 776 | 201 | **774** | **202** | 774 | 202 | 16 | **598** | **261** | 599 | 261 | 596 | 262 |
| 401.bzip2 | 16 | 968 | 160 | 971 | 159 | **969** | **159** | 16 | 890 | 173 | 892 | 173 | **891** | **173** |
| 403.gcc | 16 | 1259 | 102 | **1245** | **103** | 1244 | 104 | 16 | **746** | **173** | 747 | 172 | 745 | 173 |
| 429.mcf | 16 | 1202 | 121 | 1203 | 121 | **1203** | **121** | 16 | **760** | **192** | 763 | 191 | 759 | 192 |
| 445.gobmk | 16 | 904 | 186 | **903** | **186** | 903 | 186 | 16 | **695** | **241** | 695 | 241 | 695 | 241 |
| 456.hmmer | 16 | 589 | 254 | 584 | 256 | **584** | **255** | 16 | 362 | 413 | 363 | 411 | **362** | **413** |
| 458.sjeng | 16 | 974 | 199 | 973 | 199 | **973** | **199** | 16 | **887** | **218** | 885 | 219 | 887 | 218 |
| 462.libquantum | 16 | 1293 | 256 | **1295** | **256** | 1297 | 256 | 16 | **1295** | **256** | 1299 | 255 | 1292 | 257 |
| 464.h264ref | 16 | **1095** | **323** | 1092 | 324 | 1096 | 323 | 16 | 1056 | 335 | **1052** | **337** | 1050 | 337 |
| 471.omnetpp | 16 | 767 | 130 | **767** | **130** | 767 | 130 | 16 | 767 | 130 | **767** | **130** | 767 | 130 |
| 473.astar | 16 | **799** | **141** | 796 | 141 | 808 | 139 | 16 | **738** | **152** | 739 | 152 | 738 | 152 |
| 483.xalancbmk | 16 | 628 | 176 | **628** | **176** | 629 | 176 | 16 | 514 | 215 | 513 | 215 | **513** | **215** |

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
```

## Operating System Notes

```
The libhugetlbfs libraries were installed using the
installation rpms that came with the distribution.

'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=14336 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
```

## General Notes

```
Environment variables set by runspec before the start of the run:
HUGETLB_MORECORE = "yes"
LD_LIBRARY_PATH = "/root/work/cpu2006v1.1/amd909gh-libs/64:/root/work/cpu2006v1.1/amd909gh-libs/32"
```

## Base Compiler Invocation

C benchmarks:
pgcc

C++ benchmarks:
pgcpp

## 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:
-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mfprelaxed
-Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic_pgi

C++ benchmarks:
-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mfprelaxed
--zc_eh -Mipa=fast -Mipa=inline:10 -tp barcelona-32 -Bstatic_pgi

## Base Other Flags

C benchmarks:
-Mipa=jobs:4

C++ benchmarks:
-Mipa=jobs:4

## Peak Compiler Invocation

C benchmarks (except as noted below):
pathcc

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## Peak Compiler Invocation (Continued)

456.hmmer: pgcc

462.libquantum: pgcc

C++ benchmarks (except as noted below):
pgcpp

483.xalancbmk: pathCC

## 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.xalancbmk: -DSPEC_CPU_LINUX

## Peak Optimization Flags

C benchmarks:

400.perlbench: -march=barcelona -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2)
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT(pass 2)
-L/usr/lib64 -lhugetlbfs(pass 2) -Ofast -IPA:plimit=20000
-IPA:field_reorder=on -LNO:opt=0 -WOPT:if_conv=0
-CG:local_sched_alg=1

401.bzip2: -march=barcelona -O3 -OPT:alias=disjoint -OPT:Ofast
-OPT:goto=off -INLINE:aggressive=on -CG:local_sched_alg=1
-m3dnow
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT
-L/usr/lib64 -lhugetlbfs

403.gcc: -march=barcelona -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -OPT:malloc_alg=1
-LNO:trip_count=256 -LNO:prefetch_ahead=10
-CG:prefer_lru_reg=off -m32

429.mcf: -march=barcelona -O3 -ipa -INLINE:aggressive=on
-CG:gcm=off -GRA:prioritize_by_density=on -m32
-L/usr/lib -lhugetlbfs

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## Peak Optimization Flags (Continued)

445.gobmk: -march=barcelona -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2)
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT(pass 2)
-L/usr/lib64 -lhugetlbfs(pass 2) -O3 -OPT:alias=restrict
-LNO:prefetch=1 -LNO:ignore_feedback=off -CG:p2align=on

456.hmmer: -Mvect=cachesize:6291456 -fastsse -Mvect=partial
-Munroll=n:8 -Msmartalloc=huge -Msafeptr -Mprefetch=t0
-Mfprelaxed -Mipa=const -Mipa=ptr -Mipa=arg -Mipa=inline
-tp barcelona-64 -Bstatic_pgi

458.sjeng: -march=barcelona -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2)
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT(pass 2)
-L/usr/lib64 -lhugetlbfs(pass 2) -O3 -ipa
-LNO:ignore_feedback=off -LNO:full_unroll=10 -LNO:fusion=0
-LNO:fission=2 -IPA:pu_reorder=2 -CG:ptr_load_use=0
-OPT:unroll_times_max=8 -INLINE:aggressive=on

462.libquantum: -Mvect=cachesize:6291456 -fastsse -Munroll=m:8
-Msmartalloc=huge -Mprefetch=distance:4 -Mfprelaxed
-Mipa=fast -Mipa=inline -Mipa=noarg -tp barcelona-64
-Bstatic_pgi

464.h264ref: -march=barcelona -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2)
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT(pass 2)
-L/usr/lib64 -lhugetlbfs(pass 2) -O3 -IPA:plimit=20000
-OPT:alias=disjoint -LNO:prefetch=0 -CG:ptr_load_use=0
-CG:push_pop_int_saved_regs=off -CG:prefer_lru_reg=off

C++ benchmarks:

471.omnetpp: basepeak = yes

473.astar: -Mpfi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2)
-Mipa=inline:6(pass 2) -Mvect=cachesize:6291456 -fastsse
-O4 -Msmartalloc=huge -Msafeptr=global -Mfprelaxed
--zc_eh -tp barcelona-32 -Bstatic_pgi

483.xalancbmk: -march=barcelona -Ofast -INLINE:aggressive=on -m32
-L/root/work/libraries/SmartHeap_8.1/lib -lsmartheap

## Peak Other Flags

C benchmarks:

Continued on next page

## Peak Other Flags (Continued)

456.hmmer: `-Mipa=jobs:4`

462.libquantum: `-Mipa=jobs:4`

C++ benchmarks (except as noted below):
`-Mipa=jobs:4`(pass 2)

483.xalancbmk: `No flags used`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/pgi72_linux_flags.html`
`http://www.spec.org/cpu2006/flags/CPU2006_flags.20090710.html`
`http://www.spec.org/cpu2006/flags/amd-platform-amd909gh.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2006/flags/pgi72_linux_flags.xml`
`http://www.spec.org/cpu2006/flags/CPU2006_flags.20090710.xml`
`http://www.spec.org/cpu2006/flags/amd-platform-amd909gh.xml`


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