



# SPEC® CINT2006 Result

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Dell Inc.

SPECint®\_rate2006 = 404

PowerEdge R715 (AMD Opteron 6176 SE, 2.30 GHz)

SPECint\_rate\_base2006 = 349

CPU2006 license: 55

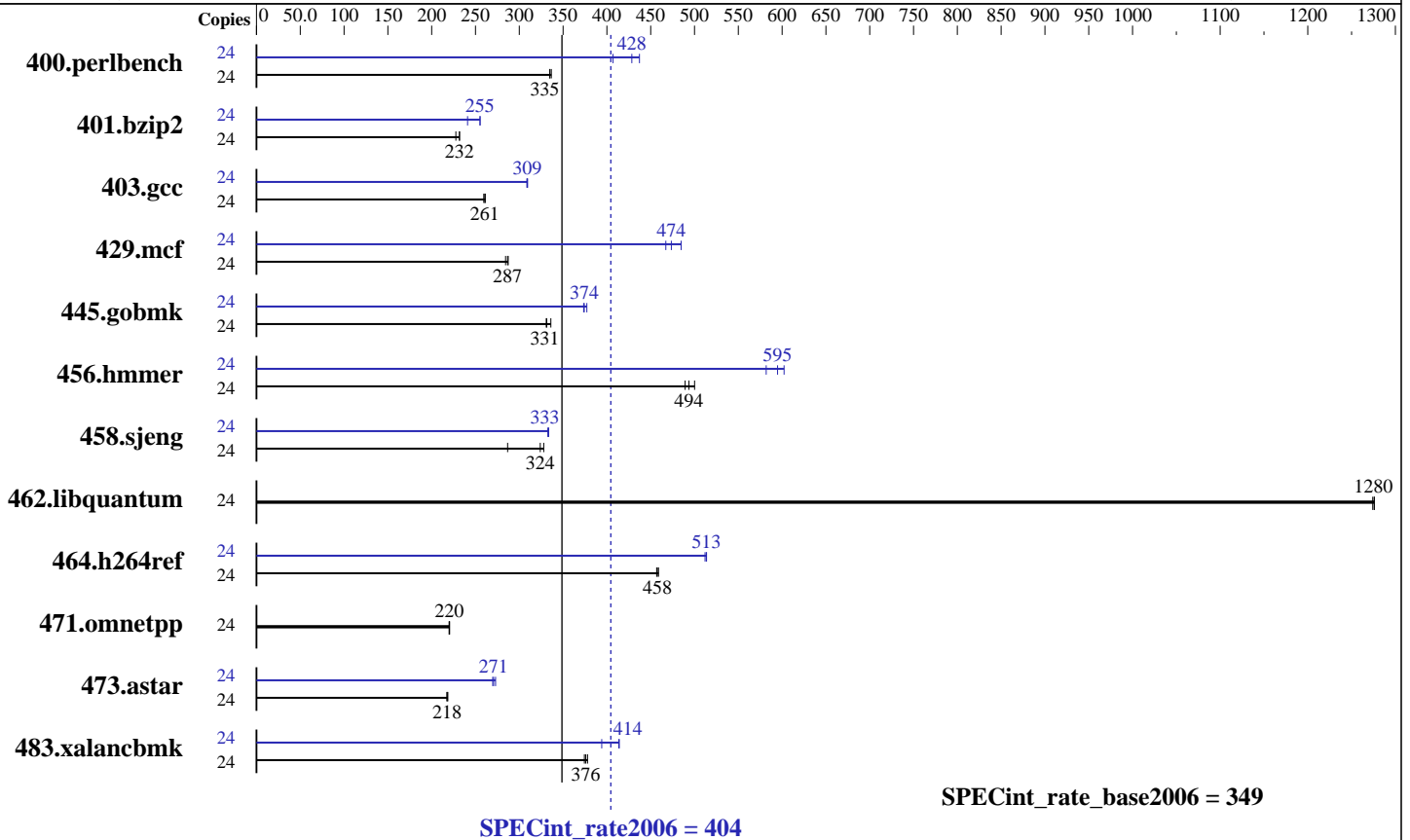
Test date: Aug-2010

Test sponsor: Dell Inc.

Hardware Availability: Mar-2010

Tested by: Dell Inc.

Software Availability: Jul-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 DDR3-1333 DR RDIMM, CL9, ECC)  
 Disk Subsystem: 1 x 146 GB SAS 10000 RPM SAS  
 Other Hardware: None

## Software

Operating System: SUSE Linux Enterprise Server 11 (x86\_64)  
 Kernel 2.6.27.19-5-default  
 Compiler: x86 Open64 4.2.4 Compiler Suite (from AMD)  
 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: 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  | 24     | 700        | 335         | 697         | 337        | <b>700</b>  | <b>335</b> | 24     | 576        | 407         | <b>547</b>  | <b>428</b> | 536        | 437        |
| 401.bzip2      | 24     | 1018       | 228         | <b>1000</b> | <b>232</b> | 999         | 232        | 24     | 961        | 241         | 907         | 255        | <b>908</b> | <b>255</b> |
| 403.gcc        | 24     | <b>741</b> | <b>261</b>  | 740         | 261        | 745         | 259        | 24     | <b>625</b> | <b>309</b>  | 626         | 309        | 624        | 309        |
| 429.mcf        | 24     | 770        | 284         | 762         | 287        | <b>764</b>  | <b>287</b> | 24     | <b>462</b> | <b>474</b>  | 452         | 485        | 468        | 467        |
| 445.gobmk      | 24     | <b>760</b> | <b>331</b>  | 749         | 336        | 761         | 331        | 24     | 668        | 377         | <b>673</b>  | <b>374</b> | 674        | 373        |
| 456.hammer     | 24     | 448        | 500         | 458         | 489        | <b>454</b>  | <b>494</b> | 24     | 372        | 602         | 385         | 582        | <b>376</b> | <b>595</b> |
| 458.sjeng      | 24     | 886        | 328         | <b>896</b>  | <b>324</b> | 1013        | 287        | 24     | <b>871</b> | <b>333</b>  | 873         | 333        | 871        | 333        |
| 462.libquantum | 24     | <b>390</b> | <b>1280</b> | 390         | 1270       | 390         | 1280       | 24     | <b>390</b> | <b>1280</b> | 390         | 1270       | 390        | 1280       |
| 464.h264ref    | 24     | 1157       | 459         | 1163        | 457        | <b>1161</b> | <b>458</b> | 24     | 1037       | 512         | <b>1034</b> | <b>513</b> | 1034       | 514        |
| 471.omnetpp    | 24     | <b>681</b> | <b>220</b>  | 682         | 220        | 680         | 220        | 24     | <b>681</b> | <b>220</b>  | 682         | 220        | 680        | 220        |
| 473.astar      | 24     | 775        | 217         | <b>774</b>  | <b>218</b> | 771         | 218        | 24     | <b>622</b> | <b>271</b>  | 625         | 270        | 617        | 273        |
| 483.xalancbmk  | 24     | 438        | 378         | <b>441</b>  | <b>376</b> | 442         | 374        | 24     | 420        | 394         | <b>400</b>  | <b>414</b> | 400        | 414        |

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=10800 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 = "450"  
LD\_LIBRARY\_PATH = "/cpu2006/amd1002-rate-libs-revC/64:/cpu2006/amd1002-rate-libs-revC/32"

The x86 Open64 Compiler Suite is only available from (and supported by) AMD at  
<http://developer.amd.com/cpu/open64>

Binaries were compiled on SLES10 SP2 with binutils 2.18



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## 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:  
-march=barcelona -mso -Ofast -CG:local\_sched\_alg=1  
-INLINE:aggressive=on -IPA:plimit=8000 -IPA:small\_pu=100  
-HP:bdt=2m:heap=2m  
  
C++ benchmarks:  
-march=barcelona -mso -Ofast -m32 -INLINE:aggressive=on  
-CG:cmp\_peep=on -L/root/work/libraries/SmartHeap-8.1/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  
 483.xalancbmk: -DSPEC\_CPU\_LINUX

## Peak Optimization Flags

C benchmarks:

400.perlbench: -march=barcelona -mso -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 -mso -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 -mso -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 -mso -O3 -ipa -INLINE:aggressive=on  
 -CG:gcm=off -GRA:prioritize\_by\_density=on -m32  
 -HP:bdt=2m:heap=2m

445.gobmk: -march=barcelona -mso -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 -mso -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 -mso -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 -CG:ptr_load_use=0
          -OPT:unroll_times_max=8 -INLINE:aggressive=on
```

462.libquantum: basepeak = yes

```
464.h264ref: -march=barcelona -mso -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
```

C++ benchmarks:

471.omnetpp: basepeak = yes

```
473.astar: -march=barcelona -mso -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 -mso -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-open64-424-flags-rate-revC.20100901.html>  
<http://www.spec.org/cpu2006/flags/amd-platform-rate-revC.html>

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

<http://www.spec.org/cpu2006/flags/x86-open64-424-flags-rate-revC.20100901.xml>  
<http://www.spec.org/cpu2006/flags/amd-platform-rate-revC.xml>

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For questions about this result, please contact the tester.  
For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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