



# SPEC® CINT2006 Result

Copyright 2006-2014 Standard Performance Evaluation Corporation

Dell Inc.

SPECint®\_rate2006 = 182

PowerEdge 2970 (AMD Opteron 2427, 2.20 GHz)

SPECint\_rate\_base2006 = 144

CPU2006 license: 55

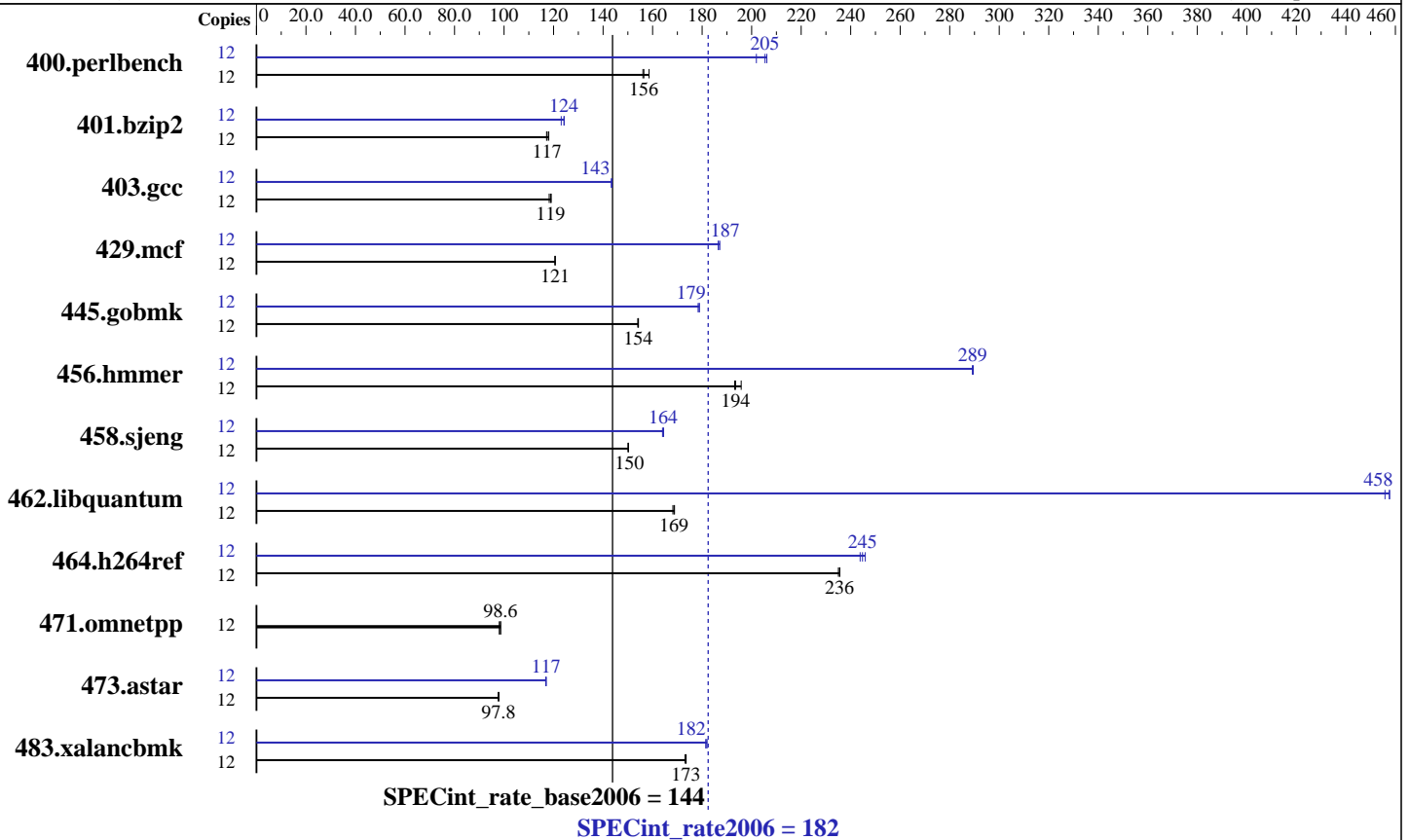
Test date: Jun-2009

Test sponsor: Dell Inc.

Hardware Availability: Jul-2009

Tested by: Dell Inc.

Software Availability: Apr-2009



## Hardware

CPU Name: AMD Opteron 2427  
 CPU Characteristics:  
 CPU MHz: 2200  
 FPU: Integrated  
 CPU(s) enabled: 12 cores, 2 chips, 6 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: 6 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 32 GB (8 x 4 GB DDR2-800)  
 Disk Subsystem: 1 x 73 GB 15000 RPM SAS  
 Other Hardware: None

## Software

Operating System: Red Hat Enterprise Linux Server release 5.3, Kernel 2.6.18-128.el5  
 Compiler: PGI Server Complete Version 8.0  
 x86 Open64 4.2.2 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: binutils 2.18  
 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	12	739	159	751	156	<b>749</b>	<b>156</b>	12	581	202	<b>571</b>	<b>205</b>	569	206
401.bzip2	12	981	118	988	117	<b>986</b>	<b>117</b>	12	941	123	<b>932</b>	<b>124</b>	932	124
403.gcc	12	817	118	811	119	<b>813</b>	<b>119</b>	12	<b>674</b>	<b>143</b>	674	143	673	144
429.mcf	12	<b>907</b>	<b>121</b>	907	121	908	121	12	587	187	<b>587</b>	<b>187</b>	585	187
445.gobmk	12	<b>817</b>	<b>154</b>	816	154	817	154	12	706	178	704	179	<b>704</b>	<b>179</b>
456.hammer	12	572	196	<b>579</b>	<b>194</b>	580	193	12	387	289	<b>387</b>	<b>289</b>	387	289
458.sjeng	12	966	150	<b>967</b>	<b>150</b>	967	150	12	883	164	885	164	<b>884</b>	<b>164</b>
462.libquantum	12	1473	169	<b>1474</b>	<b>169</b>	1478	168	12	543	458	<b>543</b>	<b>458</b>	546	456
464.h264ref	12	1127	236	1130	235	<b>1128</b>	<b>236</b>	12	1080	246	1089	244	<b>1085</b>	<b>245</b>
471.omnetpp	12	761	98.6	765	98.1	<b>761</b>	<b>98.6</b>	12	761	98.6	765	98.1	<b>761</b>	<b>98.6</b>
473.astar	12	<b>861</b>	<b>97.8</b>	863	97.6	860	97.9	12	720	117	<b>720</b>	<b>117</b>	721	117
483.xalancbmk	12	477	174	478	173	<b>477</b>	<b>173</b>	12	<b>456</b>	<b>182</b>	456	181	455	182

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=5400 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 = "/root/cpu2006-1.1/amd0905is-libs/64:/root/cpu2006-1.1/amd0905is-libs/32"  
PGI\_HUGE\_PAGES = "450"

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



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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 -Ofast -CG:local\_sched\_alg=1 -HP:bdt=2m:heap=2m

C++ benchmarks:  
-march=barcelona -Ofast -m32 -INLINE:aggressive=on  
-L/root/work/libraries/SmartHeap-8.1/lib -lsmartheap

## Peak Compiler Invocation

C benchmarks (except as noted below):  
opencc

456.hmmer: pgcc

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

473.astar: pgcpp



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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=barcelona -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 -fb_create fbdata(pass 1)
           -fb_opt fbdata(pass 2) -O3 -OPT:alias=disjoint
           -OPT:unroll_size=0 -OPT:Ofast -OPT:goto=off
           -INLINE:aggressive=on -CG:local_sched_alg=1 -m3dnw
           -HP:bdt=2m:heap=2m

403.gcc: -march=barcelona -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

429.mcf: -march=barcelona -O3 -ipa -INLINE:aggressive=on
         -CG:gcm=off -GRA:prioritize_by_density=on -m32
         -HP:bdt=2m:heap=2m

445.gobmk: -march=barcelona -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: -fastsse -Mvect=partial -Munroll=n:8 -Msmartalloc=huge
           -Msafeptr -Mprefetch=t0 -Mfprelaxed -Mipa=const -Mipa=ptr
           -Mipa=arg -Mipa=inline -tp shanghai-64 -Bstatic_pgi

```

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## Peak Optimization Flags (Continued)

```
458.sjeng: -march=barcelona -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
          -HP:bdt=2m:heap=2m
```

```
462.libquantum: -march=barcelona -Ofast -LNO:pf2=0 -CG:gcm=off
                -CG:use_prefetchnta=on -CG:cmp_peep=on -WOPT:aggstr=0
                -HP:bdt=2m:heap=2m -OPT:alias=disjoint
                -INLINE:aggressive=on -IPA:space=1000 -IPA:plimit=20000
```

```
464.h264ref: -march=barcelona -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 -HP:bdt=2m:heap=2m
```

C++ benchmarks:

471.omnetpp: basepeak = yes

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

```
483.xalancbmk: -march=barcelona -Ofast -INLINE:aggressive=on -m32
               -CG:cmp_peep=on -GRA:unspill=on -TENV:frame_pointer=off
               -L/root/work/libraries/SmartHeap-8.1/lib -lsmarheap
```

## Peak Other Flags

C benchmarks:

456.hmmr: -Mipa=jobs:4

C++ benchmarks:

473.astar: -Mipa=jobs:4(pass 2)

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

[http://www.spec.org/cpu2006/flags/pgi80\\_linux\\_flags.20090710.html](http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090710.html)  
<http://www.spec.org/cpu2006/flags/x86-open64-4.2.2-flags.html>  
<http://www.spec.org/cpu2006/flags/amd-platform.html>

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

[http://www.spec.org/cpu2006/flags/pgi80\\_linux\\_flags.20090710.xml](http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090710.xml)  
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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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