



# SPEC<sup>®</sup> CINT2006 Result

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Dell Inc.

SPECint<sup>®</sup>\_rate2006 = 257

PowerEdge R715 (AMD Opteron 6128, 2.00 GHz)

SPECint\_rate\_base2006 = 223

CPU2006 license: 55

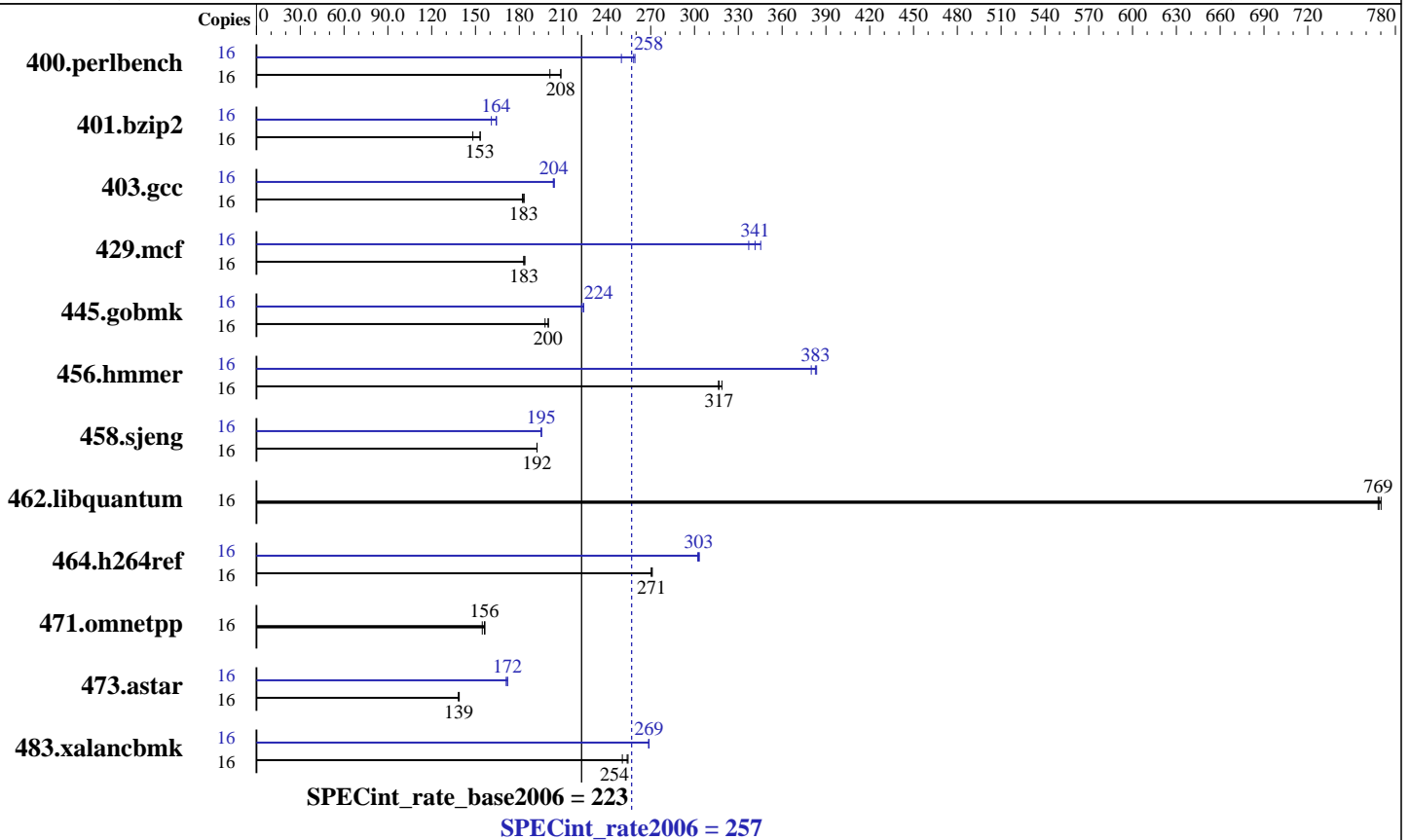
Test date: Aug-2010

Test sponsor: Dell Inc.

Hardware Availability: Mar-2010

Tested by: Dell Inc.

Software Availability: Jul-2010



## Hardware

CPU Name: AMD Opteron 6128  
 CPU Characteristics:  
 CPU MHz: 2000  
 FPU: Integrated  
 CPU(s) enabled: 16 cores, 2 chips, 8 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 / 4 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	16	778	201	750	209	<b>750</b>	<b>208</b>	16	625	250	<b>605</b>	<b>258</b>	603	259
401.bzip2	16	1042	148	<b>1008</b>	<b>153</b>	1007	153	16	960	161	<b>941</b>	<b>164</b>	939	164
403.gcc	16	703	183	707	182	<b>704</b>	<b>183</b>	16	631	204	<b>633</b>	<b>204</b>	634	203
429.mcf	16	<b>796</b>	<b>183</b>	797	183	794	184	16	433	337	423	345	<b>427</b>	<b>341</b>
445.gobmk	16	849	198	839	200	<b>840</b>	<b>200</b>	16	<b>750</b>	<b>224</b>	753	223	749	224
456.hammer	16	468	319	472	316	<b>471</b>	<b>317</b>	16	393	380	<b>390</b>	<b>383</b>	389	384
458.sjeng	16	1007	192	1008	192	<b>1008</b>	<b>192</b>	16	992	195	993	195	<b>992</b>	<b>195</b>
462.libquantum	16	432	768	430	770	<b>431</b>	<b>769</b>	16	432	768	430	770	<b>431</b>	<b>769</b>
464.h264ref	16	1310	270	1306	271	<b>1308</b>	<b>271</b>	16	<b>1169</b>	<b>303</b>	1172	302	1167	303
471.omnetpp	16	639	156	647	155	<b>641</b>	<b>156</b>	16	639	156	647	155	<b>641</b>	<b>156</b>
473.astar	16	812	138	<b>811</b>	<b>139</b>	809	139	16	657	171	653	172	<b>654</b>	<b>172</b>
483.xalancbmk	16	441	251	434	254	<b>435</b>	<b>254</b>	16	411	268	411	269	<b>411</b>	<b>269</b>

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=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\_LIMIT = "896"  
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>

## Base Compiler Invocation

C benchmarks:  
openc

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## Base Compiler Invocation (Continued)

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 -lsmarheap

## Peak Compiler Invocation

C benchmarks:  
opencc

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

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## Peak Portability Flags (Continued)

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

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

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## Peak Optimization Flags (Continued)

458.sjeng (continued):

-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).

Tested with SPEC CPU2006 v1.1.

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