



# SPEC® CINT2006 Result

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## Hewlett-Packard Company

### SPECint®\_rate2006 = 203

ProLiant DL385 G6  
(2.6 GHz AMD Opteron 2435)

### SPECint\_rate\_base2006 = 159

CPU2006 license: 3

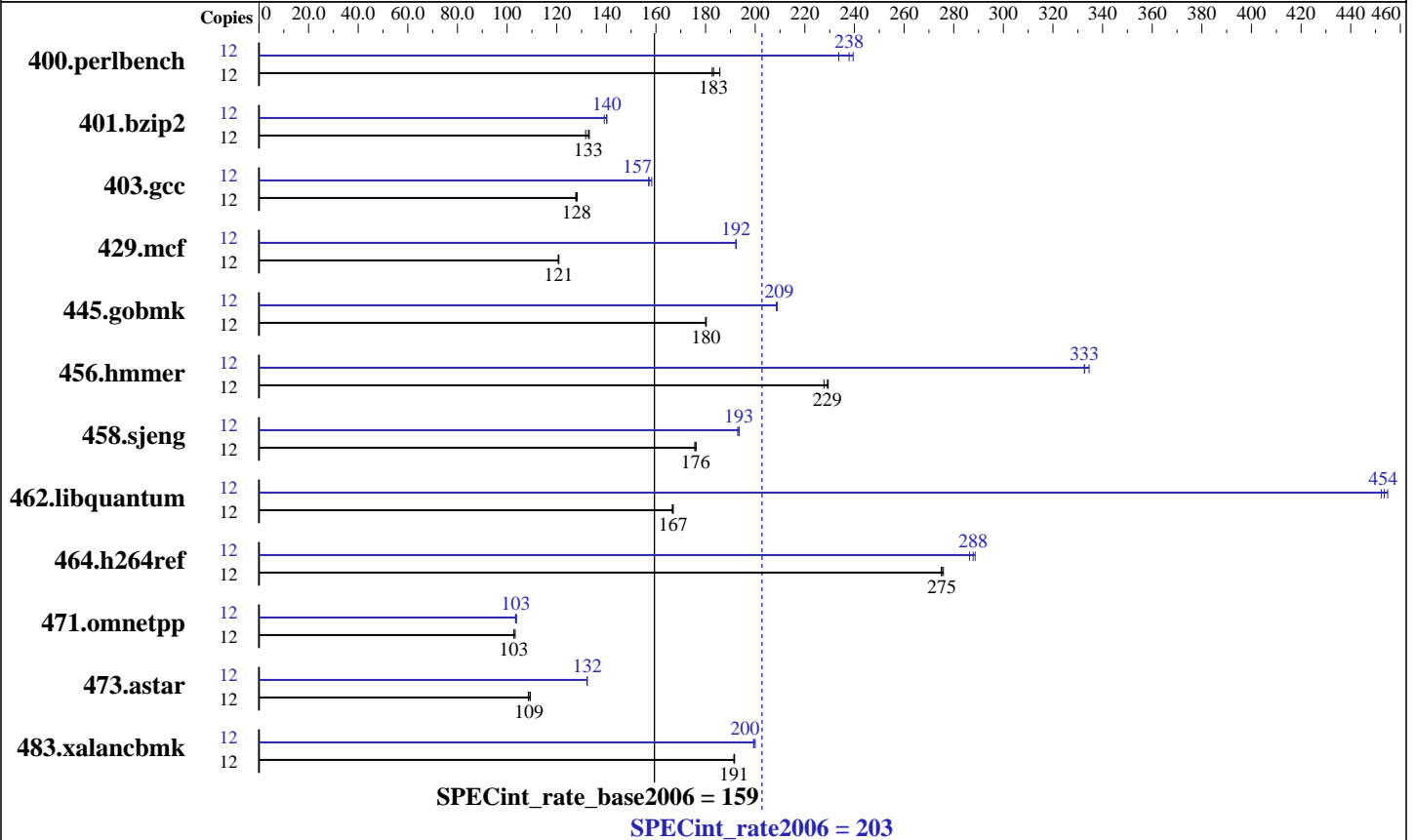
Test date: May-2009

Test sponsor: Hewlett-Packard Company

Hardware Availability: Jun-2009

Tested by: Hewlett-Packard Company

Software Availability: Apr-2009



### Hardware

CPU Name: AMD Opteron 2435  
 CPU Characteristics: 2600  
 CPU MHz: Integrated  
 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 (8x4 GB, PC2-6400P CL5)  
 Disk Subsystem: 1 x 120 GB SFF SATA, 5400 RPM  
 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  
 Auto Parallel: No  
 File System: ext3  
 System State: Run level 3 (multi-user)  
 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	631	186	642	183	<b>640</b>	<b>183</b>	12	502	234	490	239	<b>493</b>	<b>238</b>		
401.bzip2	12	<b>872</b>	<b>133</b>	870	133	879	132	12	832	139	<b>826</b>	<b>140</b>	826	140		
403.gcc	12	<b>755</b>	<b>128</b>	757	128	753	128	12	<b>615</b>	<b>157</b>	610	158	615	157		
429.mcf	12	908	121	906	121	<b>906</b>	<b>121</b>	12	569	192	<b>569</b>	<b>192</b>	569	192		
445.gobmk	12	698	180	<b>699</b>	<b>180</b>	699	180	12	603	209	604	209	<b>603</b>	<b>209</b>		
456.hammer	12	<b>489</b>	<b>229</b>	492	228	488	229	12	335	335	<b>337</b>	<b>333</b>	337	333		
458.sjeng	12	824	176	827	176	<b>825</b>	<b>176</b>	12	<b>751</b>	<b>193</b>	750	194	753	193		
462.libquantum	12	1493	167	1490	167	<b>1490</b>	<b>167</b>	12	<b>548</b>	<b>454</b>	550	452	547	455		
464.h264ref	12	966	275	<b>965</b>	<b>275</b>	963	276	12	927	286	<b>923</b>	<b>288</b>	920	289		
471.omnetpp	12	<b>730</b>	<b>103</b>	730	103	726	103	12	722	104	<b>725</b>	<b>103</b>	725	103		
473.astar	12	<b>774</b>	<b>109</b>	776	109	770	109	12	<b>637</b>	<b>132</b>	637	132	637	132		
483.xalancbmk	12	<b>432</b>	<b>191</b>	432	192	433	191	12	415	199	414	200	<b>415</b>	<b>200</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=5400 in /etc/sysctl.conf  
mount -t hugetlbfs nodev /mnt/hugepages

## Platform Notes

BIOS configuration:  
Power Regulator set to HP Static High Performance Mode  
Memory channel mode set to Independent

## General Notes

Environment variables set by runspec before the start of the run:  
HUGETLB\_LIMIT = "450"  
LD\_LIBRARY\_PATH = "/cpu2006/amd0905is-libs/64:/cpu2006/amd0905is-libs/32"  
NCPUS = "6"  
PGI\_HUGE\_PAGES = "450"

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## General Notes (Continued)

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:  
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.hmmmer: -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 -lsmarheap

## Peak Compiler Invocation

C benchmarks (except as noted below):  
opencc

456.hmmmer: pgcc

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

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## Peak Compiler Invocation (Continued)

473.astar: pgcpp

## 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) -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

```

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## Peak Optimization Flags (Continued)

456.hmmr: -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

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: -march=barcelona -Ofast -CG:gcm=off -INLINE:aggressive=on  
-OPT:alias=disjoint -WOPT:if\_conv=0 -m32  
-L/root/work/libraries/SmartHeap-8.1/lib -lsmarheap

473.astar: -Mphi(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)



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

[http://www.spec.org/cpu2006/flags/pgi80\\_linux\\_flags.html](http://www.spec.org/cpu2006/flags/pgi80_linux_flags.html)

<http://www.spec.org/cpu2006/flags/amd-platform-amd909gh.20090710.00.html>

<http://www.spec.org/cpu2006/flags/x86-open64-4.2.2-flags.html>

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

[http://www.spec.org/cpu2006/flags/pgi80\\_linux\\_flags.xml](http://www.spec.org/cpu2006/flags/pgi80_linux_flags.xml)

<http://www.spec.org/cpu2006/flags/amd-platform-amd909gh.20090710.00.xml>

<http://www.spec.org/cpu2006/flags/x86-open64-4.2.2-flags.xml>

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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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