



# SPEC® CINT2006 Result

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## Hewlett-Packard Company

**SPECint®\_rate2006 = 406**

ProLiant BL465c G7  
(2.30 GHz AMD Opteron 6176)

**SPECint\_rate\_base2006 = 351**

CPU2006 license: 3

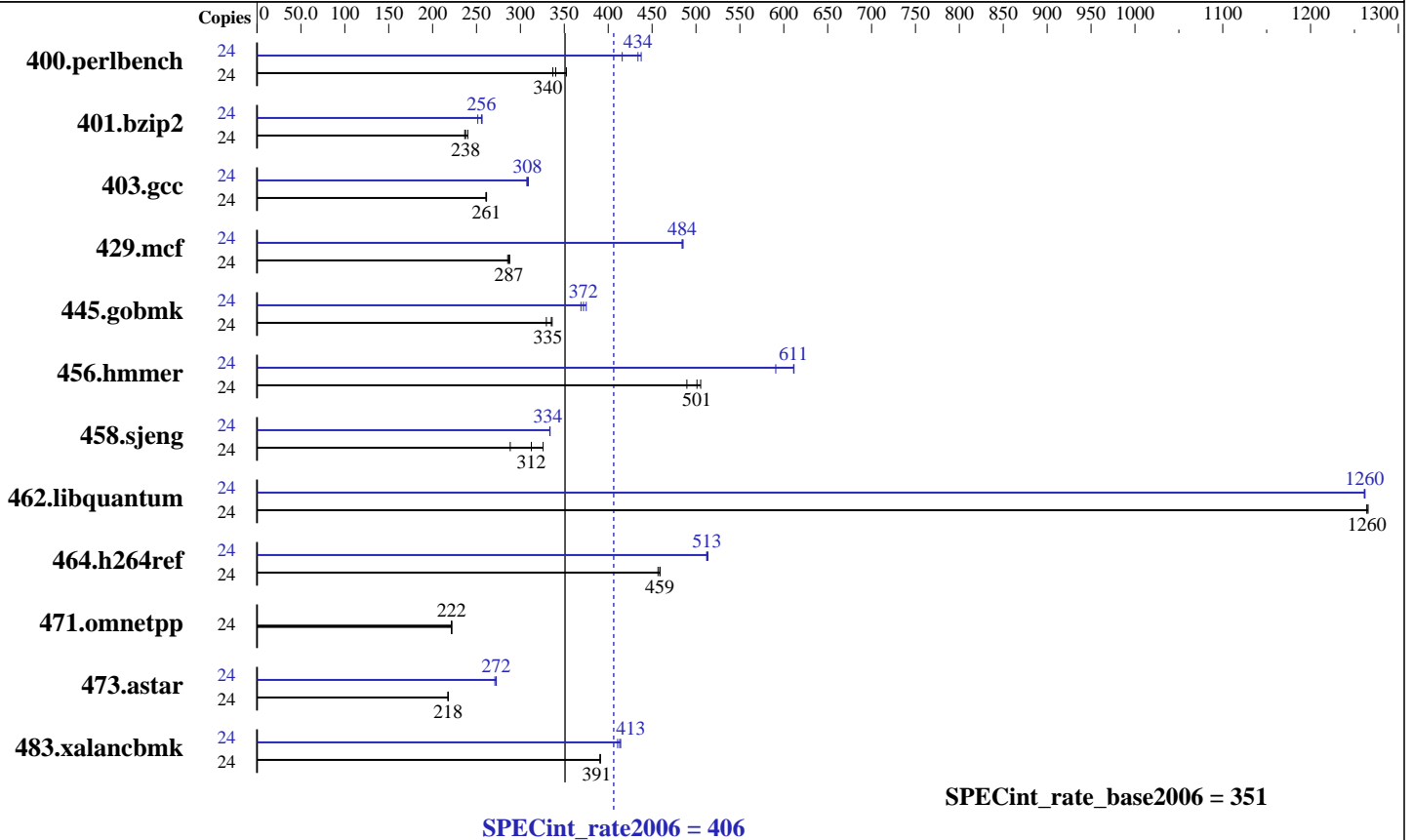
Test date: Jan-2011

Test sponsor: Hewlett-Packard Company

Hardware Availability: Feb-2011

Tested by: Hewlett-Packard Company

Software Availability: Aug-2010



### Hardware

CPU Name: AMD Opteron 6176  
 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 2Rx4 PC3-10600R-9, ECC)  
 Disk Subsystem: 1 x 300 GB 10 K SAS  
 Other Hardware: None

### Software

Operating System: SUSE Linux Enterprise Server 11 (x86\_64) SP1  
 Kernel 2.6.32.12-0.7-default  
 Compiler: x86 Open64 4.2.4 Compiler Suite (from AMD)  
 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: 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	665	352	<b>689</b>	<b>340</b>	696	337	24	564	416	536	438	<b>540</b>	<b>434</b>
401.bzip2	24	965	240	<b>975</b>	<b>238</b>	979	237	24	921	251	903	256	<b>906</b>	<b>256</b>
403.gcc	24	741	261	739	261	<b>740</b>	<b>261</b>	24	629	307	625	309	<b>627</b>	<b>308</b>
429.mcf	24	761	288	767	286	<b>763</b>	<b>287</b>	24	451	485	<b>452</b>	<b>484</b>	452	484
445.gobmk	24	749	336	<b>751</b>	<b>335</b>	764	330	24	671	375	682	369	<b>677</b>	<b>372</b>
456.hammer	24	457	490	443	505	<b>447</b>	<b>501</b>	24	<b>366</b>	<b>611</b>	366	612	379	591
458.sjeng	24	891	326	<b>929</b>	<b>312</b>	1007	288	24	<b>871</b>	<b>334</b>	871	333	870	334
462.libquantum	24	393	1260	393	1270	<b>393</b>	<b>1260</b>	24	394	1260	<b>394</b>	<b>1260</b>	394	1260
464.h264ref	24	1163	457	1157	459	<b>1158</b>	<b>459</b>	24	1034	514	1037	512	<b>1036</b>	<b>513</b>
471.omnetpp	24	676	222	<b>677</b>	<b>222</b>	677	221	24	676	222	<b>677</b>	<b>222</b>	677	221
473.astar	24	774	218	773	218	<b>774</b>	<b>218</b>	24	622	271	<b>619</b>	<b>272</b>	618	273
483.xalancbmk	24	424	391	424	391	<b>424</b>	<b>391</b>	24	403	411	400	414	<b>401</b>	<b>413</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=10800 in /etc/sysctl.conf  
mount -t hugetlbfs nodev /mnt/hugepages

## Platform Notes

BIOS Configuration:  
HP Power Profile set to Maximum Performance  
Thermal Configuration set to Increased Cooling

## General Notes

Environment variables set by runspec before the start of the run:  
HUGETLB\_LIMIT = "450"  
LD\_LIBRARY\_PATH = "/cpu2006/amd1002mc-rate-libs-revC/64:/cpu2006/amd1002mc-rate-libs-revC/32"

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 -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: -march=barcelona -mso -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 -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/hp-amd-linux-flags.20100330.html>

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

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

<http://www.spec.org/cpu2006/flags/hp-amd-linux-flags.20100330.xml>

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

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