



# SPEC® CINT2006 Result

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## Hewlett-Packard Company

SPECint®\_rate2006 = 448

Proliant DL385p Gen8  
(2.60 GHz AMD Opteron 6344)

SPECint\_rate\_base2006 = 391

CPU2006 license: 3

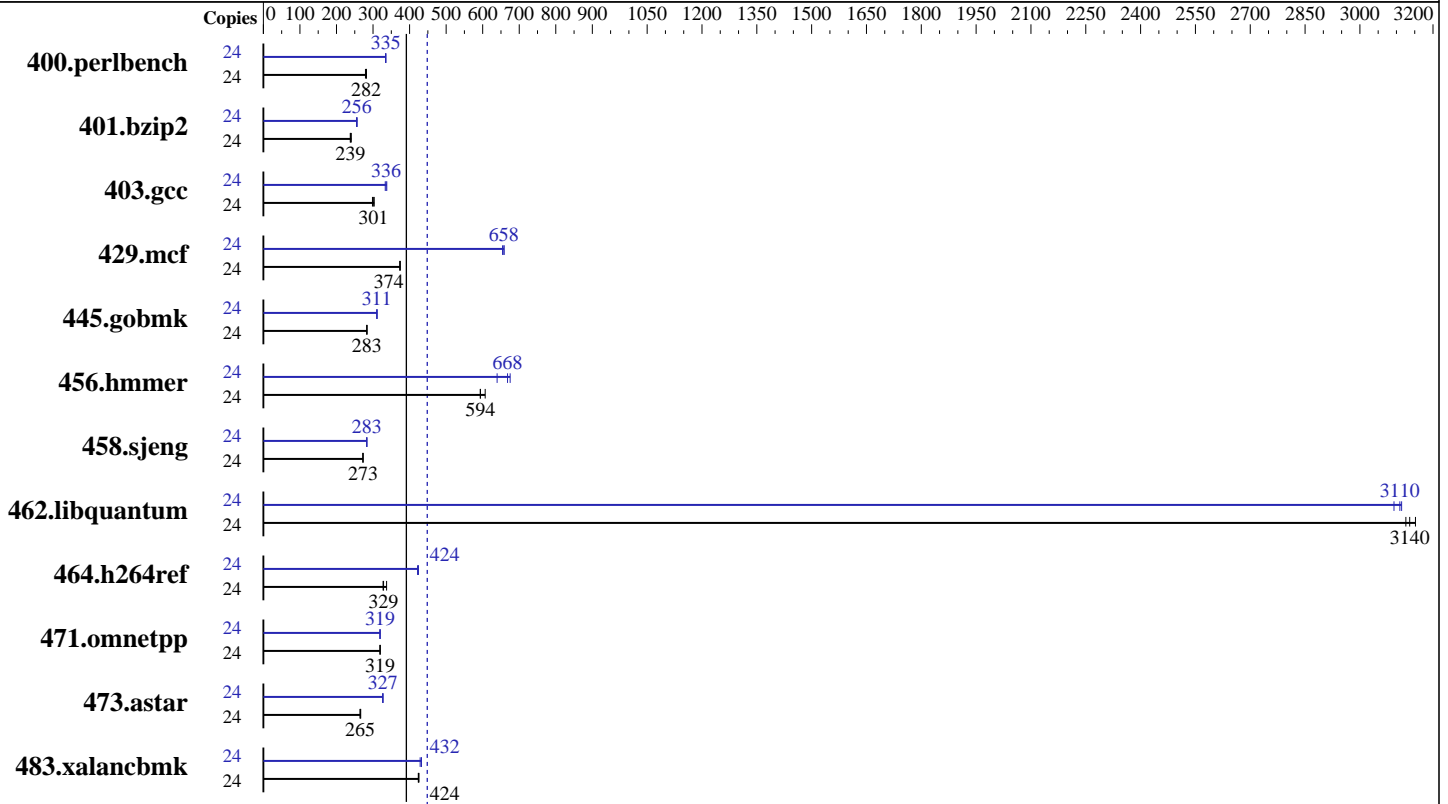
Test date: Sep-2013

Test sponsor: Hewlett-Packard Company

Hardware Availability: Nov-2012

Tested by: Hewlett-Packard Company

Software Availability: Feb-2013



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### Hardware

CPU Name: AMD Opteron 6344  
 CPU Characteristics: AMD Turbo CORE technology up to 3.20 GHz  
 CPU MHz: 2600  
 FPU: Integrated  
 CPU(s) enabled: 24 cores, 2 chips, 12 cores/chip  
 CPU(s) orderable: 1,2 chips  
 Primary Cache: 384 KB I on chip per chip,  
 64 KB I shared / 2 cores;  
 16 KB D on chip per core  
 Secondary Cache: 12 MB I+D on chip per chip, 2 MB shared / 2 cores  
 L3 Cache: 16 MB I+D on chip per chip, 8 MB shared / 6 cores  
 Other Cache: None  
 Memory: 128 GB (16 x 8 GB 2Rx4 PC3-12800R-11, ECC)  
 Disk Subsystem: 1 x 1 TB 7.2 K SATA, RAID 0  
 Other Hardware: None

### Software

Operating System: Red Hat Enterprise Linux Server release 6.4  
 Kernel 2.6.32-358.el6.x86\_64  
 Compiler: C/C++: Version 4.5.2 of x86 Open64 Compiler Suite (from AMD)  
 Auto Parallel: No  
 File System: ext4  
 System State: Run level 3 (multi-user)  
 Base Pointers: 32/64-bit  
 Peak Pointers: 32/64-bit  
 Other Software: SmartHeap 10.0 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	<b>833</b>	<b>282</b>	840	279	832	282	24	<b>701</b>	<b>335</b>	702	334	699	335
401.bzip2	24	974	238	963	241	<b>970</b>	<b>239</b>	24	<b>906</b>	<b>256</b>	903	257	909	255
403.gcc	24	647	298	637	303	<b>642</b>	<b>301</b>	24	580	333	<b>576</b>	<b>336</b>	572	338
429.mcf	24	<b>586</b>	<b>374</b>	584	375	586	373	24	<b>332</b>	<b>658</b>	335	654	332	658
445.gobmk	24	890	283	888	283	<b>888</b>	<b>283</b>	24	<b>811</b>	<b>311</b>	812	310	809	311
456.hammer	24	369	607	<b>377</b>	<b>594</b>	377	594	24	<b>335</b>	<b>668</b>	332	675	350	639
458.sjeng	24	1067	272	<b>1065</b>	<b>273</b>	1065	273	24	<b>1026</b>	<b>283</b>	1026	283	1027	283
462.libquantum	24	159	3130	<b>159</b>	<b>3140</b>	158	3150	24	160	3110	<b>160</b>	<b>3110</b>	161	3090
464.h264ref	24	<b>1615</b>	<b>329</b>	1622	327	1575	337	24	1253	424	1259	422	<b>1253</b>	<b>424</b>
471.omnetpp	24	469	320	<b>470</b>	<b>319</b>	470	319	24	471	319	<b>470</b>	<b>319</b>	469	320
473.astar	24	633	266	<b>636</b>	<b>265</b>	636	265	24	<b>516</b>	<b>327</b>	515	327	516	327
483.xalancbmk	24	391	424	389	426	<b>390</b>	<b>424</b>	24	383	433	386	429	<b>383</b>	<b>432</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 transparent\_hugepage=never as a boot parameter in /boot/grub/menu.lst

Set vm/nr\_hugepages=21504 in /etc/sysctl.conf  
mount -t hugetlbfs nodev /mnt/hugepages

## Platform Notes

BIOS Configuration:  
HP Power Profile set to maximum Performance  
Memory Power Savings Mode set Maximum Performance  
Thermal Configuration set to Maximum Cooling  
Dynamic Power Savings Mode Response set to Fast  
Collaborative Power Control set to Disabled  
Dynamic Power Capping Functionality set to Disabled



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## General Notes

Environment variables set by runspec before the start of the run:

HUGETLB\_LIMIT = "896"

LD\_LIBRARY\_PATH = "/cpu2006/amd1206-rate-libs-revA/32:/cpu2006/amd1206-rate-libs-revA/64"

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

Binaries were compiled on a system with 2x AMD Opteron 6386SE chips + 128GB Memory using RHEL 6.3

## Base Compiler Invocation

C benchmarks:

openc

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:

-Ofast -CG:local\_sched\_alg=1 -INLINE:aggressive=ON -IPA:plimit=8000  
-IPA:small\_pu=100 -HP:bd=2m:heap=2m -mso -LNO:prefetch=2  
-march=bdver1

C++ benchmarks:

-Ofast -m32 -INLINE:aggressive=on -CG:cmp\_peep=on -D\_\_OPEN64\_FAST\_SET  
-march=bdver1 -L/root/work/libraries/SmartHeap-10/lib -lsmartheap



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## 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
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
464.h264ref: -DSPEC_CPU_LP64
473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LINUX
```

## Peak Optimization Flags

C benchmarks:

```
400.perlbench: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-LNO:prefetch=2 -LNO:opt=0 -IPA:plimit=20000
-OPT:unroll_times_max=8 -OPT:unroll_size=256
-OPT:unroll_level=2 -OPT:keep_ext=on -WOPT:if_conv=0
-WOPT:sib=on -CG:local_sched_alg=1 -CG:unroll_fb_req=on
-CG:movext_icmp=off -HP:bd=2m:heap=2m -march=bdver1
-GRA:aggr_loop_splitting=off -GRA:loop_splitting=off

401.bzip2: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -O3
-LNO:prefetch=2 -LNO:pf2=0 -OPT:alias=disjoint
-OPT:goto=off -CG:local_sched_alg=1 -HP:bd=2m:heap=2m
-march=bdver2

403.gcc: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-LNO:trip_count=256 -CG:cmp_peep=on -CG:pre_minreg_level=2
-m32 -HP:bd=2m:heap=2m -GRA:unspill=on -IPA:small_pu=200
-WOPT:sib=on -march=bdver2 -mno-fma4

429.mcf: -O3 -OPT:unroll_times_max=5 -ipa -INLINE:aggressive=on
-CG:gcm=off -CG:dsched=on -GRA:prioritize_by_density=on
-m32 -HP:bd=2m:heap=2m -mso -march=bdver1

445.gobmk: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-OPT:unroll_size=256 -OPT:unroll_times_max=8
-OPT:keep_ext=on -IPA:plimit=750 -IPA:min_hotness=300
```

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## Peak Optimization Flags (Continued)

445.gobmk (continued):

-IPA:pu\_reorder=1 -LNO:ignore\_feedback=off -WOPT:if\_conv=2  
-HP:bd=2m:heap=2m -march=bdver1

456.hmmr: -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -Ofast

-LNO:prefetch=2 -OPT:alias=disjoint  
-OPT:unroll\_times\_max=16 -OPT:unroll\_size=512  
-OPT:unroll\_level=2 -OPT:keep\_ext=on -CG:cflow=0  
-CG:cmp\_peep=on -CG:pre\_local\_sched=off -HP:bd=2m:heap=2m  
-CG:p2align=0 -CG:load\_exe=3 -CG:dsched=on -march=bdver1

458.sjeng: -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -Ofast

-CG:ptr\_load\_use=0 -CG:divrem\_opt=on -CG:movext\_icmp=off  
-CG:locs\_best=on -LNO:full\_unroll=10 -IPA:pu\_reorder=2  
-HP:heap=2m:bd=2m -WOPT:sib=on -march=bdver1

462.libquantum: -Ofast -mso -OPT:unroll\_size=512 -OPT:unroll\_times\_max=16

-LNO:prefetch=2 -LNO:prefetch\_ahead=4 -LNO:pf2=0  
-CG:local\_sched\_alg=1 -CG:p2align=0 -INLINE:aggressive=ON  
-IPA:plimit=15000 -IPA:small\_pu=100  
-HP:bd=2m:heap=2m,limit=300 -march=bdver2

464.h264ref: -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -O3

-OPT:unroll\_size=256 -OPT:unroll\_times\_max=2  
-IPA:plimit=20000 -OPT:alias=disjoint -CG:ptr\_load\_use=0  
-CG:local\_sched\_alg=1 -HP:bd=2m:heap=2m -march=bdver1

C++ benchmarks:

471.omnetpp: -Ofast -m32 -INLINE:aggressive=on -CG:cmp\_peep=on

-WOPT:sib=on -D\_\_OPEN64\_FAST\_SET -march=bdver2 -mno-fma4  
-L/root/work/libraries/SmartHeap-10/lib -lsmarheap

473.astar: -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -Ofast

-WOPT:if\_conv=0 -WOPT:sib=on -CG:divrem\_opt=on  
-CG:p2align=1 -CG:dsched=on -GRA:optimize\_boundary=on  
-OPT:alias=disjoint -INLINE:aggressive=on  
-IPA:small\_pu=3000 -IPA:plimit=3000 -HP:bd=2m:heap=2m  
-march=bdver1

483.xalancbmk: -Ofast -LNO:prefetch=2 -OPT:unroll\_size=512

-OPT:unroll\_times\_max=8 -D\_\_OPEN64\_FAST\_SET  
-INLINE:aggressive=on -m32 -CG:cmp\_peep=on  
-CG:local\_sched=off -CG:p2align=1 -GRA:unspill=on  
-TENV:frame\_pointer=off -fno-emit-exceptions -march=bdver2  
-mno-fma4  
-L/root/work/libraries/SmartHeap-10/lib -lsmarheap



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

<http://www.spec.org/cpu2006/flags/x86-open64-452-flags-rate-revA-II.html>  
<http://www.spec.org/cpu2006/flags/HP-Platform-Flags-AMD-V1.2-A.20130813.html>

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

<http://www.spec.org/cpu2006/flags/x86-open64-452-flags-rate-revA-II.xml>  
<http://www.spec.org/cpu2006/flags/HP-Platform-Flags-AMD-V1.2-A.20130813.xml>

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

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