



SPEC® CINT2006 Result

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Hewlett-Packard Company

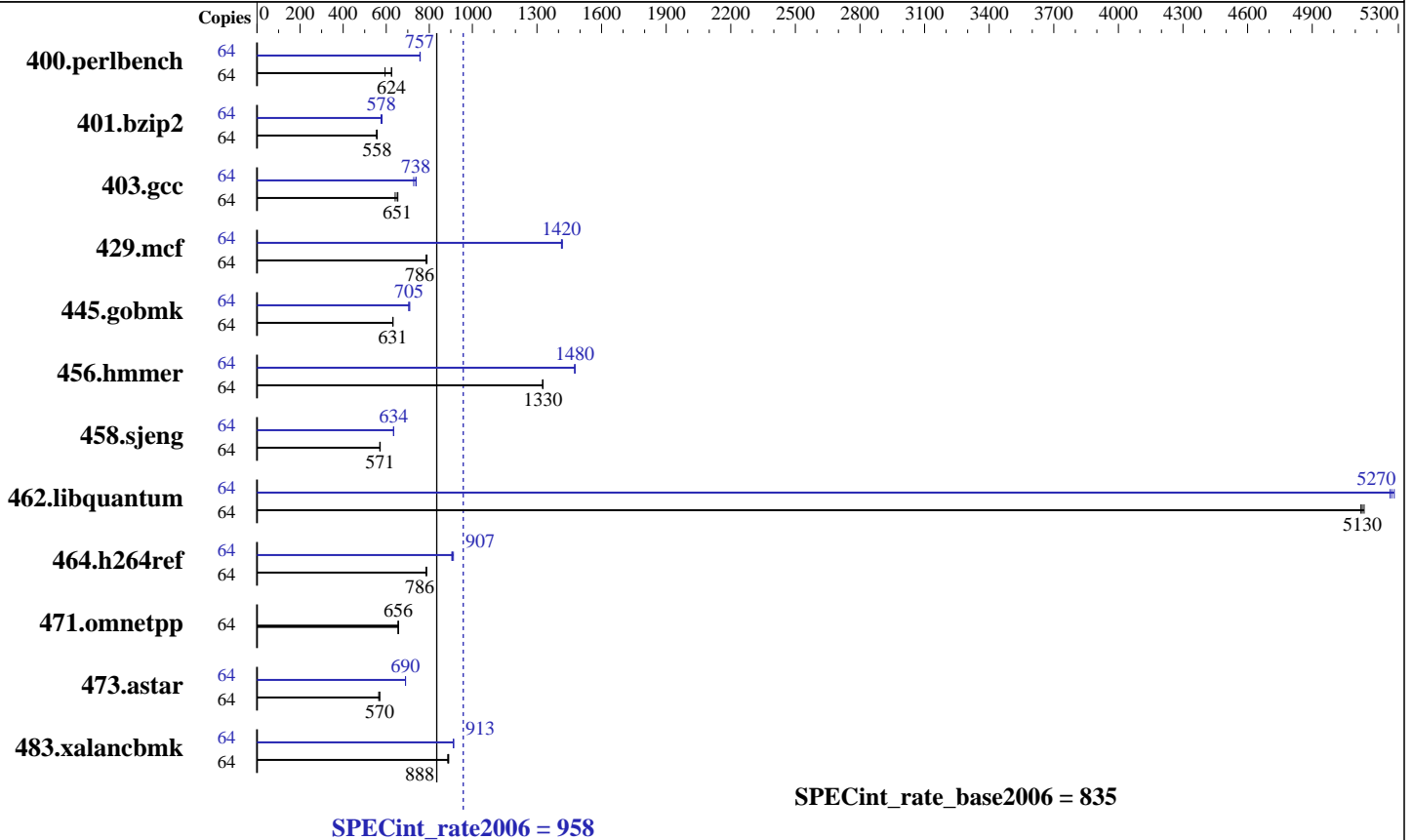
SPECint®_rate2006 = 958

ProLiant BL685c G7
(2.3 GHz AMD Opteron 6276)

SPECint_rate_base2006 = 835

CPU2006 license: 3
Test sponsor: Hewlett-Packard Company
Tested by: Hewlett-Packard Company

Test date: Sep-2011
Hardware Availability: Nov-2011
Software Availability: Jul-2011



Hardware

CPU Name: AMD Opteron 6276
 CPU Characteristics: AMD Turbo CORE technology up to 3.20 GHz
 CPU MHz: 2300
 FPU: Integrated
 CPU(s) enabled: 64 cores, 4 chips, 16 cores/chip
 CPU(s) orderable: 2,4 chips
 Primary Cache: 512 KB I on chip per chip,
 64 KB I shared / 2 cores;
 16 KB D on chip per core
 Secondary Cache: 16 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 / 8 cores
 Other Cache: None
 Memory: 256 GB (16 x 16 GB 2Rx4 PC3L-10600R-9, ECC)
 Disk Subsystem: 2 x 146 GB 15 K SAS
 Other Hardware: None

Software

Operating System: Red Hat Enterprise Linux Server release 6.1,
 Kernel 2.6.32-131.0.15.el6.x86_64
 Compiler: C/C++: Version 4.2.5.2 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	64	<u>1001</u>	<u>624</u>	1051	595	1000	625	64	825	758	826	757	<u>826</u>	<u>757</u>
401.bzip2	64	<u>1107</u>	<u>558</u>	1114	554	1106	558	64	1072	576	<u>1069</u>	<u>578</u>	1064	581
403.gcc	64	<u>791</u>	<u>651</u>	803	642	788	654	64	<u>698</u>	<u>738</u>	708	728	698	739
429.mcf	64	739	789	743	786	<u>743</u>	<u>786</u>	64	<u>412</u>	<u>1420</u>	413	1410	412	1420
445.gobmk	64	<u>1064</u>	<u>631</u>	1063	631	1064	631	64	952	705	946	709	<u>952</u>	<u>705</u>
456.hammer	64	450	1330	<u>450</u>	<u>1330</u>	450	1330	64	404	1480	405	1480	<u>405</u>	<u>1480</u>
458.sjeng	64	<u>1357</u>	<u>571</u>	1353	572	1358	570	64	1220	635	1221	634	<u>1221</u>	<u>634</u>
462.libquantum	64	258	5140	<u>258</u>	<u>5130</u>	259	5130	64	252	5260	<u>252</u>	<u>5270</u>	251	5280
464.h264ref	64	<u>1801</u>	<u>786</u>	1804	785	1798	788	64	1553	912	1566	905	<u>1562</u>	<u>907</u>
471.omnetpp	64	609	656	611	655	<u>610</u>	<u>656</u>	64	609	656	611	655	<u>610</u>	<u>656</u>
473.astar	64	795	565	<u>789</u>	<u>570</u>	789	570	64	651	690	<u>652</u>	<u>690</u>	652	689
483.xalancbmk	64	496	890	499	886	<u>497</u>	<u>888</u>	64	484	913	<u>484</u>	<u>913</u>	485	911

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 kernel/randomize_va_space=0 in /etc/sysctl.conf

Set vm/nr_hugepages=57344 in /etc/sysctl.conf
Set "nodev /mnt/hugepages hugetlbfs defaults 0 0" in /etc/fstab

Platform Notes

BIOS settings:
HP Power Profile set to Maximum Performance
Thermal Configuration set to Increased Cooling
HPC Optimization set to Enabled



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General Notes

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

HUGETLB_LIMIT = "896"

LD_LIBRARY_PATH = "/cpu2006/amd1104-rate-libs-revA/32:/cpu2006/amd1104-rate-libs-revA/64"

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.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=bdver1 -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

C++ benchmarks:
-march=bdver1 -Ofast -m32 -INLINE:aggressive=on -CG:cmp_peep=on
-D__OPEN64_FAST_SET -L/root/work/libraries/SmartHeap-10/lib -lsmarheap

Peak Compiler Invocation

C benchmarks:
opencc

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Peak Compiler Invocation (Continued)

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
483.xalancbmk: -DSPEC_CPU_LINUX
```

Peak Optimization Flags

C benchmarks:

```
400.perlbench: -march=bdver1 -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

401.bzip2: -march=bdver1 -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

403.gcc: -march=bdver1 -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

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

445.gobmk: -march=bdver1 -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 -IPA:pu_reorder=1
-LNO:ignore_feedback=off -WOPT:if_conv=2 -HP:bd=2m:heap=2m
```

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Peak Optimization Flags (Continued)

```
456.hmmcr: -march=bdver1 -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:bdt=2m:heap=2m
```

```
458.sjeng: -march=bdver1 -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:bd=2m:heap=2m
           -WOPT:sib=on
```

```
462.libquantum: -march=bdver1 -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
                -INLINE:aggressive=on -IPA:plimit=15000 -IPA:small_pu=100
                -HP:bdt=2m:heap=2m,limit=300
```

```
464.h264ref: -march=bdver1 -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:bdt=2m:heap=2m
```

C++ benchmarks:

471.omnetpp: basepeak = yes

```
473.astar: -march=bdver1 -fb_create fbdata(pass 1)
            -fb_opt fbdata(pass 2) -Ofast -TENV:frame_pointer=off
            -WOPT:if_conv=0 -WOPT:sib=on -CG:divrem_opt=on
            -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=bdver1 -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 -GRA:unspill=on -TENV:frame_pointer=off
                -fno-emit-exceptions
                -L/root/work/libraries/SmartHeap-10/lib -lsmarheap
```

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

<http://www.spec.org/cpu2006/flags/x86-open64-425-flags-rate-revA.html>
<http://www.spec.org/cpu2006/flags/hp-amd-linux-flags.20100330.html>
<http://www.spec.org/cpu2006/flags/amd1104-platform-rate-revA.html>



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

- <http://www.spec.org/cpu2006/flags/x86-open64-425-flags-rate-revA.xml>
- <http://www.spec.org/cpu2006/flags/hp-amd-linux-flags.20100330.xml>
- <http://www.spec.org/cpu2006/flags/amd1104-platform-rate-revA.xml>

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For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.1.
Report generated on Thu Jul 24 00:56:52 2014 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 14 November 2011.