**Hewlett-Packard Company**

ProLiant BL465c Gen8  
(2.60 GHz AMD Opteron 6344)

**SPECfp\textsuperscript{\_rate\textsubscript{2006}} = 368**  
**SPECfp\_rate\_base\textsubscript{2006} = 333**

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System: Red Hat Enterprise Linux Server release 6.3, Kernel 2.6.32-279.el6.x86_64</td>
<td>CPU Name: AMD Opteron 6344</td>
</tr>
<tr>
<td>Compiler: C/C++/Fortran: Version 4.5.2 of x86 Open64 Compiler Suite (from AMD)</td>
<td>CPU Characteristics: AMD Turbo CORE technology up to 3.20 GHz</td>
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<tr>
<td>Auto Parallel: No</td>
<td>CPU MHz: 2600</td>
</tr>
<tr>
<td>File System: ext3</td>
<td>FPU: Integrated</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
<td>CPU(s) enabled: 24 cores, 2 chips, 12 cores/chip</td>
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<tr>
<td>Base Pointers: 64-bit</td>
<td>CPU(s) orderable: 1,2 chips</td>
</tr>
<tr>
<td>Peak Pointers: 32/64-bit</td>
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**Test date:** Dec-2012  
**Hardware Availability:** Nov-2012  
**Software Availability:** Aug-2012

| Test sponsor: Hewlett-Packard Company | CPU2006 license: 3 |
| Tested by: Hewlett-Packard Company | Test date: Dec-2012 |
| Hardware Availability: Nov-2012 | Software Availability: Aug-2012 |

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### Results Table

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</tr>
</tbody>
</table>

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

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SPEC CFP2006 Result

Hewlett-Packard Company

ProLiant BL465c Gen8
(2.60 GHz AMD Opteron 6344)

SPECfp_rate2006 = 368
SPECfp_rate_base2006 = 333

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

Test date: Dec-2012
Hardware Availability: Nov-2012
Software Availability: Aug-2012

Operating System Notes (Continued)

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
Thermal Configuration set to Maximum Cooling
Collaborative Power Control set to Disable
Minimum Processor Idle Power Cle State to Enabled
Processor Power and Utilization Monitoring set to Disable

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:
opencc
C++ benchmarks:
openCC
Fortran benchmarks:
openf95
Benchmarks using both Fortran and C:
opencc openf95

Base Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64

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CPU2006 license: 3
Test sponsor: Hewlett-Packard Company
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Base Portability Flags (Continued)

436. cactusADM: -DSPEC_CPU_LP64 -fno-second-underscore
437. leslie3d: -DSPEC_CPU_LP64
444. namd: -DSPEC_CPU_LP64
447. dealII: -DSPEC_CPU_LP64
450. soplex: -DSPEC_CPU_LP64
453. povray: -DSPEC_CPU_LP64
454. calculix: -DSPEC_CPU_LP64
459. GemsFDTD: -DSPEC_CPU_LP64
465. tonto: -DSPEC_CPU_LP64
470. lbm: -DSPEC_CPU_LP64
481. wrf: -DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LP64
        -fno-second-underscore
482. sphinx3: -DSPEC_CPU_LP64

Base Optimization Flags

C benchmarks:
-Ofast -OPT:malloc_alg=1 -HP:bd=2m:heap=2m -IPA:plimit=8000
-IPA:small_pu=100 -mso -march=bdver1

C++ benchmarks:
-Ofast -static -CG:load_exe=0 -OPT:malloc_alg=1 -INLINE:aggressive=on
-HP:bd=2m:heap=2m -D__OPEN64_FAST_SET -march=bdver1

Fortran benchmarks:
-Ofast -LNO:blocking=off -LNO:simd_peel_align=on -OPT:rsqrt=2
-OPT:unroll_size=256 -HP:bd=2m:heap=2m -mso -march=bdver1

Benchmarks using both Fortran and C:
-Ofast -OPT:malloc_alg=1 -HP:bd=2m:heap=2m -IPA:plimit=8000
-IPA:small_pu=100 -mso -march=bdver1 -LNO:blocking=off
-LNO:simd_peel_align=on -OPT:rsqrt=2 -OPT:unroll_size=256

Peak Compiler Invocation

C benchmarks:
opencc

C++ benchmarks:
openCC

Fortran benchmarks:
openf95

Benchmarks using both Fortran and C:
opencc openf95
Hewlett-Packard Company
ProLiant BL465c Gen8
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Peak Portability Flags

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453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LP64
        -fno-second-underscore

Peak Optimization Flags

C benchmarks:

433.milc: -Ofast -CG:movnti=1 -CG:locs_best=on -HP:bdt=2m:heap=2m
        -IPA:plimit=7000 -IPA:callee_limit=1200
        -OPT:struct_array_copy=2 -OPT:alias=field_sensitive -mso
        -march=bdver1

470.lbm: basepeak = yes

482.sphinx3: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
        -m32 -IPA:plimit=1000 -OPT:malloc_alg=2 -CG:cmp_pype=on
        -CG:p2align=0 -CG:load_exe=0 -INLINE:aggressive=on
        -LNO:prefetch=2 -LNO:prefetch_ahead=4
        -mso -march=bdver2

C++ benchmarks:

444.namd: -Ofast -IPA:plimit=3000 -LNO:ignore_feedback=off
        -CG:local_sched_alg=0 -CG:load_exe=0 -OPT:unroll_size=256
        -fno-exceptions -HP:bdt=2m:heap=2m -LNO:if_select_conv=1
        -OPT:alias=disjoint -LNO:psimd_iso_unroll=ON
        -march=bdver1

447.dealII: -Ofast -D__OPEN64_FAST_SET -static -INLINE:aggressive=on
        -LNO:opt=1 -LNO:simd=2 -fno-emit-exceptions -m32
        -OPT:unroll_times_max=8 -OPT:unroll_size=256
        -OPT:unroll_level=2 -HP:bdt=2m:heap=2m -GRA:unspill=on
        -CG:cmp_pype=on -CG:movext_icmp=off -TENV:frame_pointer=off
        -march=bdver1

Continued on next page
**Peak Optimization Flags (Continued)**

450.soplex: `-fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -O3
-LNO:ignore_feedback=off -INLINE:aggressive=on -OPT:RO=1
-OPT:IEEE_arith=3 -OPT:IEEE_NaN_Inf=off
-OPT:fold_unsigned_relops=on -fno-exceptions -CG:p2align=0
-m32 -mno-fma4 -HP:bd=2m:heap=2m -WOPT:sib=on
-march=bdver1`

453.povray: `-fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-CG:pre_local_sched=off -CG:p2align=0 -CG:p2align_split=on
-CG:dsched=on -INLINE:aggressive=on -HP:bd=2m:heap=2m
-OPT:transform=2 -OPT:alias=disjoint -WOPT:aggcm=0
-march=bdver2`

**Fortran benchmarks:**

410.bwaves: `-fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-OPT:Ofast -OPT:treeheight=on -LNO:blocking=off
-LNO:ignore_feedback=off -LNO:fu=4 -LNO:loop_model_s simd=on
-LNO:simd_rm_unity_remainder=on -WOPT:aggstr=0
-HP:bd=2m:heap=2m -CG:cmp_peep=on -march=bdver1`

416.gamess: `-fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-LNO:fu=6 -LNO:blocking=0 -LNO:simd=2 -OPT:ro=3
-OPT:recip=on -CG:local_sched_alg=1 -HP:bd=2m:heap=2m
-WOPT:sib=on -march=bdver1`

434.zeusmp: `-fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-LNO:blocking=off -LNO:interchange=off -IPA:plimit=1500
-HP:bd=2m:heap=2m -march=bdver1`

437.leslie3d: `-ofast -CG:pre_minreg_level=2 -LNO:simd=0 -LNO:fusion=2
-HP:bd=2m:heap=2m -mso -march=bdver1`

459.GemsFDTD: `-ofast -IPA:plimit=1500 -OPT:unroll_size=1024
-OPT:unroll_times_max=16 -LNO:fission=2
-CG:local_sched_alg=2 -HP:bd=2m:heap=2m -march=bdver1`

465.tonto: `-ofast -OPT:alias=no_f90_pointer_alias -LNO:blocking=off
-CG:load_exe=1 -CG:local_sched_alg=3 -IPA:plimit=525
-HP:bd=2m:heap=2m -march=bdver1`

**Benchmarks using both Fortran and C:**

435.gromacs: `-ofast -OPT:rsqrt=2 -HP:bd=2m:heap=2m
-CG:local_sched_alg=2 -CG:load_exe=3 -GRA:unspill=on
-march=bdver1 -LNO:simd=3`

436.cactusADM: `-fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-LNO:blocking=off -LNO:prefetch=2 -LNO:pf2=0
-LNO:prefetch_ahead=4 -HP -CG:locs_shallow_depth=1
-CG:load_exe=0 -CG:dsched=on -WOPT:sib=on -march=bdver1

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Peak Optimization Flags (Continued)

454.calculix: -Ofast -OPT:unroll_size=256 -OPT:alias=disjoint
    -GRA:optimize_boundary=on -CG:dsched=on -HP:bdt=2m:heap=2m
    -march=bdver1

481.wrf: -Ofast -LNO:blocking=off -LANG:copyinout=off
    -IPA:callee_limit=5000 -GRA:prioritize_by_density=on -HP
    -WOPT:sib=on -march=bdver1

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

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-AMD-V1.2-A.20121205.xml
http://www.spec.org/cpu2006/flags/x86-open64-452-flags-rate-revA-II.xml

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

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