## SPEC® CFP2006 Result

### Hewlett-Packard Company

**ProLiant BL685c G7 (2.60 GHz, AMD Opteron 6344)**

<table>
<thead>
<tr>
<th>CPU2006 license</th>
<th>Test sponsor</th>
<th>Tested by</th>
<th>SPECfp&lt;sup&gt;®&lt;/sup&gt;_rate2006 =</th>
<th>SPECfp_rate_base2006 =</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Hewlett-Packard Company</td>
<td>Hewlett-Packard Company</td>
<td>736</td>
<td>664</td>
</tr>
</tbody>
</table>

**Test date:** Jul-2013  
**Hardware Availability:** Nov-2012  
**Software Availability:** Feb-2013

### Software

- **Operating System:** Red Hat Enterprise Linux Server release 6.4, Kernel 2.6.32-220.el6.x86_64
- **Compiler:** C/C++/Fortran: 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:** 64-bit
- **Peak Pointers:** 32/64-bit

### 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:** 48 cores, 4 chips, 12 cores/chip
- **CPU(s) orderable:** 2,4 chips

### SPECfpu

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECfpu&lt;sup&gt;®&lt;/sup&gt;_rate2006</th>
<th>SPECfpu_rate_base2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>647</td>
<td>591</td>
</tr>
<tr>
<td>416.gamess</td>
<td>539</td>
<td>633</td>
</tr>
<tr>
<td>433.milc</td>
<td>540</td>
<td>735</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>708</td>
<td>814</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>656</td>
<td>875</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>539</td>
<td>985</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>445</td>
<td>875</td>
</tr>
<tr>
<td>444.namd</td>
<td>445</td>
<td>1290</td>
</tr>
<tr>
<td>447.dealII</td>
<td>531</td>
<td>1220</td>
</tr>
<tr>
<td>450.soplex</td>
<td>572</td>
<td>725</td>
</tr>
<tr>
<td>453.povray</td>
<td>527</td>
<td>1050</td>
</tr>
<tr>
<td>454.calculix</td>
<td>623</td>
<td>1050</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>465</td>
<td>725</td>
</tr>
<tr>
<td>465.tonto</td>
<td>416</td>
<td>850</td>
</tr>
<tr>
<td>470.lbm</td>
<td>623</td>
<td>755</td>
</tr>
<tr>
<td>481.wrf</td>
<td>755</td>
<td>755</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>654</td>
<td>758</td>
</tr>
</tbody>
</table>

**SPECfp_rate_base2006 = 664**

**SPECfp_rate2006 = 736**

**Continued on next page**

Continued on next page
Hewlett-Packard Company

ProLiant BL685c G7
(2.60 GHz, AMD Opteron 6344)

SPEC CFP2006 Result
Copyright 2006-2014 Standard Performance Evaluation Corporation

Hewlett-Packard Company

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

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:
- 256 GB (32 x 8 GB 2Rx4 PC3-12800R-11, ECC)
Disk Subsystem:
- 1 x 300 GB 10 K SAS
Other Hardware:
- None
Other Software:
- None

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Base</th>
<th></th>
<th></th>
<th></th>
<th>Base</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Seconds</td>
<td>Seconds</td>
<td>Seconds</td>
<td>Seconds</td>
<td>Seconds</td>
<td>Seconds</td>
<td>Seconds</td>
<td>Seconds</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Copy</td>
<td>Ratio</td>
<td></td>
<td>Copy</td>
<td>Ratio</td>
<td></td>
<td>Copy</td>
<td>Ratio</td>
</tr>
<tr>
<td>410.bwaves</td>
<td>48</td>
<td>1009</td>
<td>646</td>
<td>647</td>
<td>1007</td>
<td>648</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>416.gamess</td>
<td>48</td>
<td>1744</td>
<td>539</td>
<td>1744</td>
<td>539</td>
<td>664</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>433.milc</td>
<td>48</td>
<td>816</td>
<td>540</td>
<td>540</td>
<td>817</td>
<td>539</td>
<td>664</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>48</td>
<td>619</td>
<td>705</td>
<td>617</td>
<td>708</td>
<td>664</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>435.gromacs</td>
<td>48</td>
<td>522</td>
<td>656</td>
<td>522</td>
<td>656</td>
<td>664</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>48</td>
<td>654</td>
<td>877</td>
<td>656</td>
<td>875</td>
<td>664</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>48</td>
<td>1014</td>
<td>445</td>
<td>1014</td>
<td>445</td>
<td>664</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>444.namd</td>
<td>48</td>
<td>733</td>
<td>525</td>
<td>725</td>
<td>531</td>
<td>816</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>447.dealII</td>
<td>48</td>
<td>453</td>
<td>1210</td>
<td>452</td>
<td>1220</td>
<td>450</td>
<td>1220</td>
<td>450</td>
<td>1220</td>
<td>450</td>
</tr>
<tr>
<td>450.soplex</td>
<td>48</td>
<td>778</td>
<td>515</td>
<td>759</td>
<td>527</td>
<td>759</td>
<td>527</td>
<td>759</td>
<td>527</td>
<td>759</td>
</tr>
<tr>
<td>454.calculix</td>
<td>48</td>
<td>375</td>
<td>1060</td>
<td>377</td>
<td>1050</td>
<td>377</td>
<td>1050</td>
<td>377</td>
<td>1050</td>
<td>377</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>48</td>
<td>1224</td>
<td>416</td>
<td>1225</td>
<td>416</td>
<td>1223</td>
<td>416</td>
<td>1223</td>
<td>416</td>
<td>1223</td>
</tr>
<tr>
<td>465.tonto</td>
<td>48</td>
<td>758</td>
<td>623</td>
<td>779</td>
<td>606</td>
<td>720</td>
<td>656</td>
<td>656</td>
<td>656</td>
<td>656</td>
</tr>
<tr>
<td>470.lbm</td>
<td>48</td>
<td>778</td>
<td>848</td>
<td>776</td>
<td>850</td>
<td>775</td>
<td>851</td>
<td>775</td>
<td>851</td>
<td>775</td>
</tr>
<tr>
<td>481.wrf</td>
<td>48</td>
<td>726</td>
<td>738</td>
<td>720</td>
<td>745</td>
<td>719</td>
<td>745</td>
<td>719</td>
<td>745</td>
<td>719</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>48</td>
<td>1430</td>
<td>654</td>
<td>1437</td>
<td>651</td>
<td>1423</td>
<td>657</td>
<td>657</td>
<td>657</td>
<td>657</td>
</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
Continued on next page
Hewlett-Packard Company

ProLiant BL685c G7
(2.60 GHz, AMD Opteron 6344)

SPECfp_rate2006 = 736
SPECfp_rate_base2006 = 664

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

Test date: Jul-2013
Hardware Availability: Nov-2012
Software Availability: Feb-2013

Operating System Notes (Continued)

Set vm/nr_hugepages=43008 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages

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
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

Continued on next page
Hewlett-Packard Company

ProLiant BL685c G7 (2.60 GHz, AMD Opteron 6344)

SPECfp_rate2006 = 736
SPECfp_rate_base2006 = 664

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

Test date: Jul-2013
Hardware Availability: Nov-2012
Software Availability: Feb-2013

Base Portability Flags (Continued)

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

Peak Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64

Continued on next page
SPEC CFP2006 Result

Hewlett-Packard Company
ProLiant BL685c G7
(2.60 GHz, AMD Opteron 6344)

SPECfp_rate2006 = 736
SPECfp_rate_base2006 = 664

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

Test date: Jul-2013
Hardware Availability: Nov-2012
Software Availability: Feb-2013

Peak Portability Flags (Continued)

434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64
436.cactusADM: -DSPEC_CPU_LP64 -fno-second-underscore
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -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

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_peep=on
              -CG:p2align=0 -CG:load_exe=1 -CG:dsched=on
              -INLINE:aggressive=on -LNO:prefetch=2 -LNO:prefetch_ahead=4
              -mso -march=bvdver2

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_unregister=ON -march=bvdver1

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_peep=on -CG:moveext_icmp=off -TENV:frame_pointer=off
              -march=bvdver1

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_Info=off
              -OPT:fold_unsigned_relops=on -fno-exceptions -CG:p2align=0
              -m32 -mno-fma4 -HP:bdt=2m:heap=2m -WOPT:sib=on

Continued on next page
Hewlett-Packard Company

ProLiant BL685c G7
(2.60 GHz, AMD Opteron 6344)

SPECfp_rate2006 = 736
SPECfp_rate_base2006 = 664

CPU2006 license: 3
Test date: Jul-2013
Test sponsor: Hewlett-Packard Company
Hardware Availability: Nov-2012
Tested by: Hewlett-Packard Company
Software Availability: Feb-2013

Peak Optimization Flags (Continued)

450.soplex (continued):
  -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_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 -mso -march=bdver1

437.leslie3d:
  -Ofast -CG:pre_minreg_level=2 -LNO:simd=0 -LNO:fusion=2
  -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: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:bd=2m:heap=2m
  -CG:load_exe=0 -CG:dsched=on -WOPT:sib=on -march=bdver1

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

Continued on next page
Hewlett-Packard Company
ProLiant BL685c G7
(2.60 GHz, AMD Opteron 6344)

SPECfp_rate2006 = 736
SPECfp_rate_base2006 = 664

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

Test date: Jul-2013
Hardware Availability: Nov-2012
Software Availability: Feb-2013

Peak Optimization Flags (Continued)

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/x86-open64-452-flags-rate-revA-II.xml
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-AMD-V1.2-A.20130327.xml

SPEC and SPECfp are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.2.
Originally published on 30 July 2013.