SPEC® CFP2006 Result
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Hewlett-Packard Company

ProLiant BL465c G7
(2.10 GHz AMD Opteron 6272)

$SPECfp®\_rate2006 = 344$

$SPECfp\_rate\_base2006 = 320$

CPU2006 license: 3

Test sponsor: Hewlett-Packard Company

Tested by: Hewlett-Packard Company

Test date: Oct-2011

Hardware Availability: Nov-2011

Software Availability: Jul-2011

Benchmark	Copies	Result
410.bwaves	32 / 32	297 / 292
416.gamess	32 / 32	302 / 292
433.milc	32 / 32	281 / 239
434.zeusmp	32 / 32	365 / 354
435.gromacs	32 / 32	348 / 342
436.cactusADM	32 / 32	464 / 420
437.leslie3d	32 / 32	257 / 200
444.namd	32 / 32	296 / 289
447.dealII	32 / 32	646 / 617
450.soplex	32 / 32	257 / 222
453.povray	32 / 32	411 / 367
454.calculix	32 / 32	495 / 482
459.GemsFDTD	32 / 32	199 / 183
465.tonto	32 / 32	362 / 332
470.lbm	32 / 32	396 / 396
481.wrf	32 / 32	346 / 345
482.sphinx3	32 / 32	354 / 314

SPECfp_rate_base2006 = 320

SPECfp_rate2006 = 344

Hardware

CPU Name: AMD Opteron 6272

CPU Characteristics: AMD Turbo CORE technology up to 3.00 GHz

CPU MHz: 2100

FPU: Integrated

CPU(s) enabled: 32 cores, 2 chips, 16 cores/chip

CPU(s) orderable: 1,2 chips

Software

Operating System: Red Hat Enterprise Linux Server release 6.1,
Kernel 2.6.32-131.0.15.el6.x86_64

Compiler: C/C++/Fortran: Version 4.2.5.2 of
x86 Open64 Compiler Suite (from AMD)

Auto Parallel: No

File System: ext3

System State: Run level 3 (multi-user)

Base Pointers: 64-bit

Peak Pointers: 32/64-bit

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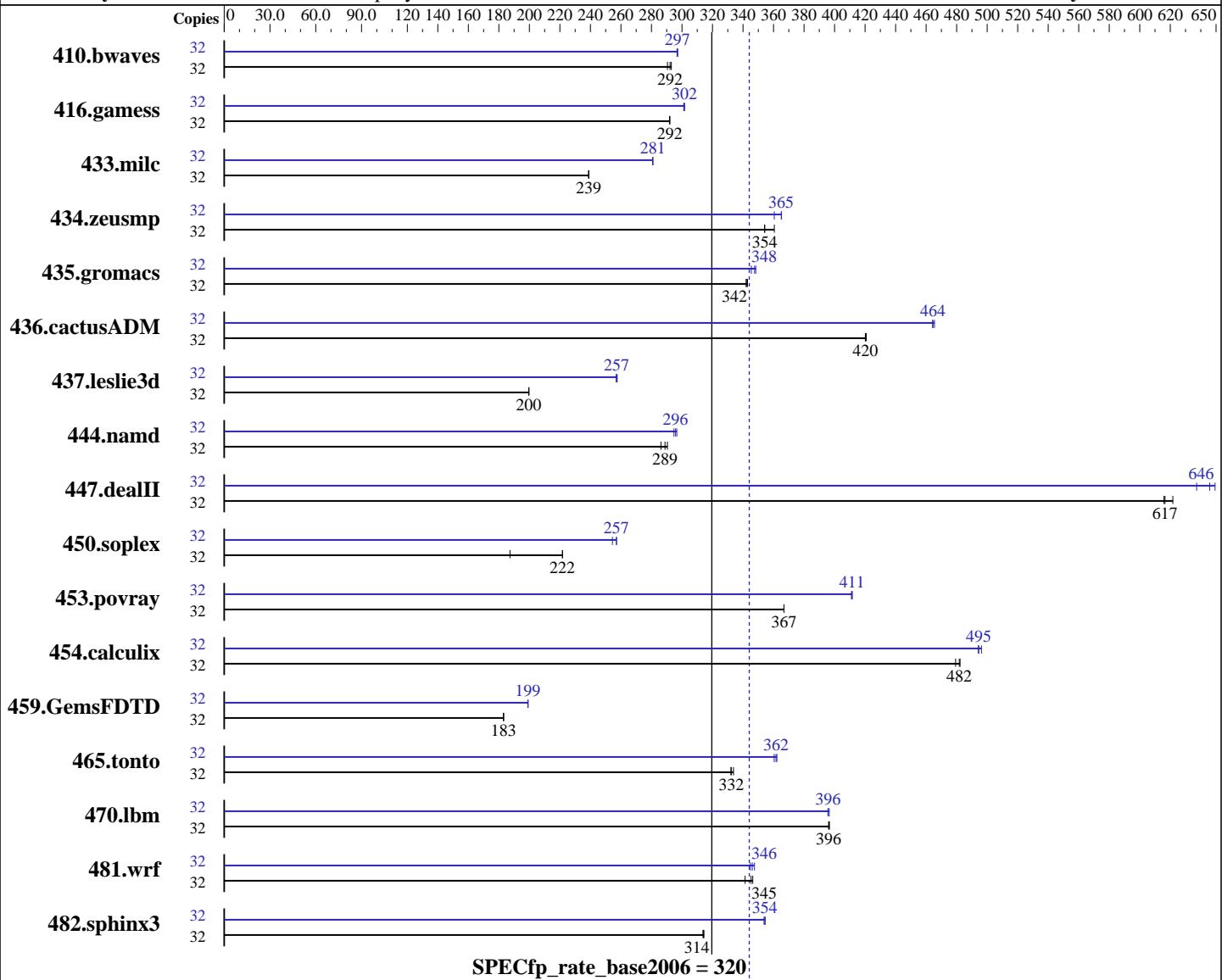SPECfp_rate_base2006 =   320

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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:	128 GB (16 x 8 GB 2Rx4 PC3-10600R-9, ECC)
Disk Subsystem:	1 x 146 GB 15 K SATA
Other Hardware:	None

Other Software: None

Results Table

Benchmark	Base						Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	32	1497	290	**1488**	**292**	1484	293	32	1463	297	1465	297	**1464**	**297**
416.gamess	32	2147	292	2145	292	**2146**	**292**	32	2077	302	**2078**	**302**	2081	301
433.milc	32	1230	239	1229	239	**1230**	**239**	32	1047	281	1046	281	**1046**	**281**
434.zeusmp	32	808	361	**822**	**354**	822	354	32	**798**	**365**	797	365	808	360
435.gromacs	32	**668**	**342**	668	342	666	343	32	**657**	**348**	656	348	661	345
436.cactusADM	32	909	421	910	420	**910**	**420**	32	821	465	824	464	**823**	**464**
437.leslie3d	32	1506	200	**1507**	**200**	1507	200	32	1171	257	**1170**	**257**	1168	258
444.namd	32	897	286	**888**	**289**	884	290	32	871	295	865	297	**868**	**296**
447.dealII	32	**594**	**617**	594	616	589	622	32	564	649	**567**	**646**	574	637
450.soplex	32	1425	187	**1204**	**222**	1204	222	32	1049	254	1038	257	**1039**	**257**
453.povray	32	464	367	464	367	**464**	**367**	32	414	412	414	411	**414**	**411**
454.calculix	32	**548**	**482**	547	482	551	479	32	**534**	**495**	534	494	532	496
459.GemsFDTD	32	1855	183	**1855**	**183**	1854	183	32	1706	199	1705	199	**1705**	**199**
465.tonto	32	**948**	**332**	948	332	943	334	32	869	362	874	360	**871**	**362**
470.lbm	32	1110	396	1109	397	**1110**	**396**	32	1109	397	**1111**	**396**	1111	396
481.wrf	32	1047	341	**1035**	**345**	1032	346	32	**1033**	**346**	1029	348	1037	345
482.sphinx3	32	1987	314	1984	314	**1987**	**314**	32	**1760**	**354**	1759	355	1763	354

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 "echo never > /sys/kernel/mm/redhat_transparent_hugepage/enabled"
```

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Operating System Notes (Continued)

```
Set "kernel/randomize_va_space=0" in /etc/sysctl.conf

Set vm/nr_hugepages=28672 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
```

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`

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
```

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Base Portability Flags (Continued)

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

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

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

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

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Peak 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
   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
```

Peak Optimization Flags

C benchmarks:

```
    433.milc: -march=bdver1 -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

     470.lbm: -march=bdver1 -Ofast -CG:cmp_peep=on
             -OPT:unroll_times_max=8 -OPT:unroll_size=256
             -OPT:unroll_level=2 -OPT:keep_ext=on -HP:bdt=2m:heap=2m
             -IPA:plimit=8000 -IPA:small_pu=100 -mso

  482.sphinx3: -march=bdver1 -fb_create fbdata(pass 1)
             -fb_opt fbdata(pass 2) -Ofast -OPT:malloc_alg=2
             -CG:cmp_peep=on -CG:local_sched_alg=2 -INLINE:aggressive=on
             -LNO:prefetch=2 -LNO:prefetch_ahead=4 -mso
```

C++ benchmarks:

```
    444.namd: -march=bdver1 -fb_create fbdata(pass 1)
             -fb_opt fbdata(pass 2) -Ofast -LNO:ignore_feedback=off
             -CG:local_sched_alg=2 -CG:load_exe=0 -OPT:unroll_size=256
             -fno-exceptions -HP:bdt=2m:heap=2m

   447.dealII: -march=bdver1 -Ofast -D__OPEN64_FAST_SET -static
             -INLINE:aggressive=on -LNO:opt=0 -LNO:simd=0
             -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:movext_icmp=off
             -TENV:frame_pointer=off
```

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Peak Optimization Flags (Continued)

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

453.povray: -march=bdver1 -fb_create fbdata(pass 1)
            -fb_opt fbdata(pass 2) -Ofast -CG:pre_local_sched=off
            -INLINE:aggressive=on -HP:bd=2m:heap=2m -OPT:transform=2
            -OPT:alias=disjoint -WOPT:aggcm=0
```

Fortran benchmarks:

```
410.bwaves: -march=bdver1 -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:bdt=2m:heap=2m -CG:cmp_peep=on

416.gamess: -march=bdver1 -fb_create fbdata(pass 1)
            -fb_opt fbdata(pass 2) -O3 -LNO:fu=6 -LNO:blocking=0
            -LNO:simd=0 -OPT:Ofast -OPT:ro=3 -OPT:unroll_size=256
            -OPT:unroll_times_max=2 -CG:local_sched_alg=1
            -HP:bdt=2m:heap=2m -WOPT:sib=on

434.zeusmp: -march=bdver1 -Ofast -LNO:blocking=off -LNO:interchange=off
            -HP:bdt=2m:heap=2m

437.leslie3d: -march=bdver1 -Ofast -CG:pre_minreg_level=2 -LNO:simd=0
              -LNO:fusion=2 -HP:bdt=2m:heap=2m -mso

459.GemsFDTD: -march=bdver1 -Ofast -OPT:unroll_size=0 -LNO:fission=2
              -CG:load_exe=0 -CG:local_sched_alg=2 -HP

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

Benchmarks using both Fortran and C:

```
435.gromacs: -march=bdver1 -fb_create fbdata(pass 1)
             -fb_opt fbdata(pass 2) -Ofast -OPT:rsqrt=2
             -HP:bdt=2m:heap=2m

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

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Peak Optimization Flags (Continued)

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

    481.wrf: -march=bdver1 -Ofast -LNO:blocking=off -LANG:copyinout=off
             -IPA:callee_limit=5000 -GRA:prioritize_by_density=on
             -CG:load_exe=1 -HP -WOPT:sib=on
```

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/amd1104-platform-rate-revA.html
http://www.spec.org/cpu2006/flags/hp-amd-linux-flags.20100330.html
http://www.spec.org/cpu2006/flags/x86-open64-425-flags-rate-revA.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/amd1104-platform-rate-revA.xml
http://www.spec.org/cpu2006/flags/hp-amd-linux-flags.20100330.xml
http://www.spec.org/cpu2006/flags/x86-open64-425-flags-rate-revA.xml

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