# SPEC® CFP2006 Result
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## Hewlett-Packard Company

ProLiant DL580 Gen8
(3.20 GHz, Intel Xeon E7-8891 v2)

$SPECfp®\_rate2006 =$ 1440

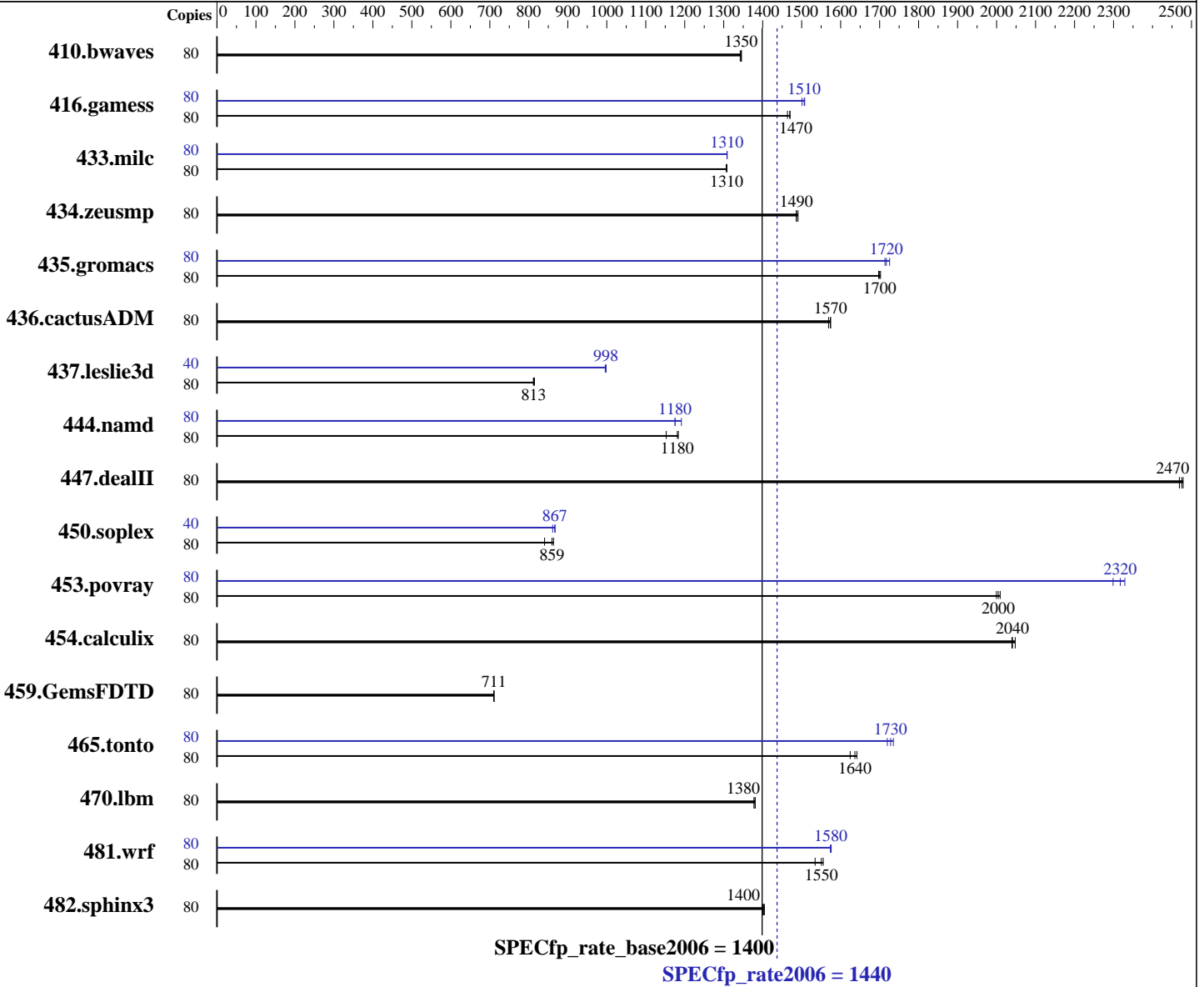$SPECfp\_rate\_base2006 =$ 1400

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

**Test date:** Apr-2014
**Hardware Availability:** Feb-2014
**Software Availability:** Nov-2013

| Copies | | |
|---|---|---|
| 410.bwaves | 80 | 1350 |
| 416.gamess | 80 | 1510 |
| | 80 | 1470 |
| 433.milc | 80 | 1310 |
| | 80 | 1310 |
| 434.zeusmp | 80 | 1490 |
| 435.gromacs | 80 | 1720 |
| | 80 | 1700 |
| 436.cactusADM | 80 | 1570 |
| 437.leslie3d | 40 | 998 |
| | 80 | 813 |
| 444.namd | 80 | 1180 |
| | 80 | 1180 |
| 447.dealII | 80 | 2470 |
| 450.soplex | 40 | 867 |
| | 80 | 859 |
| 453.povray | 80 | 2320 |
| | 80 | 2000 |
| 454.calculix | 80 | 2040 |
| 459.GemsFDTD | 80 | 711 |
| 465.tonto | 80 | 1730 |
| | 80 | 1640 |
| 470.lbm | 80 | 1380 |
| 481.wrf | 80 | 1580 |
| | 80 | 1550 |
| 482.sphinx3 | 80 | 1400 |

SPECfp_rate_base2006 = 1400

SPECfp_rate2006 = 1440

## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E7-8891 v2 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 3.70 GHz |
| CPU MHz: | 3200 |
| FPU: | Integrated |
| CPU(s) enabled: | 40 cores, 4 chips, 10 cores/chip, 2 threads/core |
| CPU(s) orderable: | 2,4 chips |
| Primary Cache: | 32 KB I + 32 KB D on chip per core |
| Secondary Cache: | 256 KB I+D on chip per core |

**Continued on next page**

## Software

| | |
|---|---|
| Operating System: | Red Hat Enterprise Linux Server release 6.5, (Santiago) Kernel 2.6.32-431.el6.x86_64 |
| Compiler: | C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux; Fortran: Version 14.0.0.080 of Intel Fortran Studio XE for Linux |
| Auto Parallel: | No |
| File System: | ext4 |

**Continued on next page**

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| | | | |
|---|---|---|---|
| L3 Cache: | 37.5 MB I+D on chip per chip | System State: | Run level 3 (multi-user) |
| Other Cache: | None | Base Pointers: | 32/64-bit |
| Memory: | 1 TB (64 x 16 GB 2Rx4 PC3-14900R-13, ECC, running at 1333 MHz and CL9) | Peak Pointers: | 32/64-bit |
| | | Other Software: | None |
| Disk Subsystem: | 1 x 400 GB SSD SAS, RAID 0 | | |
| Other Hardware: | None | | |

## Results Table

| Benchmark | Base | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 80 | 808 | 1350 | 810 | 1340 | **808** | **1350** | 80 | 808 | 1350 | 810 | 1340 | **808** | **1350** |
| 416.gamess | 80 | 1066 | 1470 | **1066** | **1470** | 1070 | 1460 | 80 | **1040** | **1510** | 1044 | 1500 | 1039 | 1510 |
| 433.milc | 80 | **562** | **1310** | 561 | 1310 | 562 | 1310 | 80 | **561** | **1310** | 561 | 1310 | 561 | 1310 |
| 434.zeusmp | 80 | 488 | 1490 | 490 | 1490 | **490** | **1490** | 80 | 488 | 1490 | 490 | 1490 | **490** | **1490** |
| 435.gromacs | 80 | 336 | 1700 | 337 | 1700 | **336** | **1700** | 80 | 333 | 1710 | **333** | **1720** | 331 | 1730 |
| 436.cactusADM | 80 | **607** | **1570** | 609 | 1570 | 607 | 1570 | 80 | **607** | **1570** | 609 | 1570 | 607 | 1570 |
| 437.leslie3d | 80 | 923 | 815 | 926 | 812 | **925** | **813** | 40 | 377 | 998 | **377** | **998** | 377 | 996 |
| 444.namd | 80 | 542 | 1180 | 557 | 1150 | **543** | **1180** | 80 | 538 | 1190 | 546 | 1180 | **546** | **1180** |
| 447.dealII | 80 | 371 | 2470 | 369 | 2480 | **370** | **2470** | 80 | 371 | 2470 | 369 | 2480 | **370** | **2470** |
| 450.soplex | 80 | **776** | **859** | 794 | 840 | 773 | 863 | 40 | 387 | 861 | **385** | **867** | 384 | 868 |
| 453.povray | 80 | 212 | 2010 | **212** | **2000** | 213 | 2000 | 80 | **184** | **2320** | 185 | 2300 | 183 | 2330 |
| 454.calculix | 80 | 324 | 2040 | **323** | **2040** | 322 | 2050 | 80 | 324 | 2040 | **323** | **2040** | 322 | 2050 |
| 459.GemsFDTD | 80 | 1195 | 710 | **1194** | **711** | 1194 | 711 | 80 | 1195 | 710 | **1194** | **711** | 1194 | 711 |
| 465.tonto | 80 | 485 | 1620 | 479 | 1640 | **481** | **1640** | 80 | **456** | **1730** | 458 | 1720 | 454 | 1740 |
| 470.lbm | 80 | 798 | 1380 | 796 | 1380 | **796** | **1380** | 80 | 798 | 1380 | 796 | 1380 | **796** | **1380** |
| 481.wrf | 80 | 582 | 1530 | **576** | **1550** | 575 | 1560 | 80 | 568 | 1570 | 567 | 1580 | **567** | **1580** |
| 482.sphinx3 | 80 | 1114 | 1400 | **1112** | **1400** | 1110 | 1400 | 80 | 1114 | 1400 | **1112** | **1400** | 1110 | 1400 |

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

## Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
Transparent Huge Pages enabled with:
 echo always > /sys/kernel/mm/redhat_transparent_hugepage/enabled
Filesystem page cache cleared with:
 echo 1 > /proc/sys/vm/drop_caches
runspec command invoked through numactl i.e.:
 numactl --interleave=all runspec <etc>

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SPECfp_rate_base2006 = 1400

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**Test date:** Apr-2014
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## Operating System Notes (Continued)

Disabled unused Linux services through "stop_services.sh" before running.

## Platform Notes

```
BIOS Configuration:
 HP Power Profile set to Maximum Performance
 Collaborative Power Control set to Disabled
 Thermal Configuration set to Maximum Cooling
 Processor Power and Utilization Monitoring set to Disabled
 Memory Refresh Rate set to Disabled

Sysinfo program /cpu2006/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
running on DL580-Gen8-SR Tue Apr 22 02:30:58 2014

This section contains SUT (System Under Test) info as seen by
some common utilities.  To remove or add to this section, see:
  http://www.spec.org/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo
   model name : Intel(R) Xeon(R) CPU E7-8891 v2 @ 3.20GHz
      4 "physical id"s (chips)
      80 "processors"
   cores, siblings (Caution: counting these is hw and system dependent.  The
   following excerpts from /proc/cpuinfo might not be reliable.  Use with
   caution.)
      cpu cores : 10
      siblings  : 20
      physical 0: cores 2 3 4 5 6 7 8 10 11 12
      physical 1: cores 2 3 4 5 6 7 8 10 11 12
      physical 2: cores 2 3 4 5 6 7 8 10 11 12
      physical 3: cores 2 3 4 5 6 7 8 10 11 12
   cache size : 38400 KB

From /proc/meminfo
   MemTotal:        1058653984 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

/usr/bin/lsb_release -d
   Red Hat Enterprise Linux Server release 6.5 (Santiago)

From /etc/*release* /etc/*version*
   redhat-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)
   system-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server

uname -a:
   Linux DL580-Gen8-SR 2.6.32-431.el6.x86_64 #1 SMP Sun Nov 10 22:19:54 EST 2013
   x86_64 x86_64 x86_64 GNU/Linux
```

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## Platform Notes (Continued)

```
  run-level 3 Apr 21 15:48

  SPEC is set to: /cpu2006
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda3       ext4  365G   81G  266G  24% /

  Additional information from dmidecode:
    BIOS HP P79 02/21/2014
    Memory:
    64x HP 712383-081 16 GB 1333 MHz 2 rank
    32x UNKNOWN NOT AVAILABLE

  (End of data from sysinfo program)
  Regarding the sysinfo display about the memory installed, the correct amount of
  memory is 1 TB and the dmidecode description should have one line reading as:
    64x HP 712383-081 16 GB 1333 MHz 2 rank
```

## General Notes

```
  Environment variables set by runspec before the start of the run:
  LD_LIBRARY_PATH = "/cpu2006/libs/32:/cpu2006/libs/64:/cpu2006/sh"

  Binaries compiled on a system with 1x Core i7-860 CPU + 8GB
  memory using RedHat EL 6.4
```

## Base Compiler Invocation

C benchmarks:
    icc   -m64

C++ benchmarks:
    icpc   -m64

Fortran benchmarks:
    ifort -m64

Benchmarks using both Fortran and C:
    icc   -m64 ifort -m64

## Base Portability Flags

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

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# Base Portability Flags (Continued)

```
   435.gromacs: -DSPEC_CPU_LP64 -nofor_main
 436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
   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 -nofor_main
  459.GemsFDTD: -DSPEC_CPU_LP64
     465.tonto: -DSPEC_CPU_LP64
      470.lbm: -DSPEC_CPU_LP64
       481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
    482.sphinx3: -DSPEC_CPU_LP64
```

# Base Optimization Flags

C benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias
-opt-mem-layout-trans=3
```

C++ benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias
-opt-mem-layout-trans=3
```

Fortran benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -opt-prefetch
```

Benchmarks using both Fortran and C:
```
-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias
-opt-mem-layout-trans=3
```

# Peak Compiler Invocation

C benchmarks:
```
icc   -m64
```

C++ benchmarks (except as noted below):
```
icpc  -m64
```
```
  450.soplex: icpc -m32
```

Fortran benchmarks:
```
ifort -m64
```

Benchmarks using both Fortran and C:
```
icc   -m64 ifort -m64
```

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

# Peak Optimization Flags

C benchmarks:

```
    433.milc: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
              -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
              -prof-use(pass 2) -auto-ilp32

     470.lbm: basepeak = yes

  482.sphinx3: basepeak = yes
```

C++ benchmarks:

```
    444.namd: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
              -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
              -prof-use(pass 2) -fno-alias -auto-ilp32

   447.dealII: basepeak = yes

   450.soplex: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
              -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
              -prof-use(pass 2) -opt-malloc-options=3

   453.povray: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
              -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
              -prof-use(pass 2) -unroll4 -ansi-alias
```

Fortran benchmarks:

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# Peak Optimization Flags (Continued)

410.bwaves: basepeak = yes

416.gamess: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -prof-use(pass 2) -unroll2
-inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: -xAVX -ipo -O3 -no-prec-div -opt-prefetch

459.GemsFDTD: basepeak = yes

465.tonto: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -auto
-inline-calloc -opt-malloc-options=3

Benchmarks using both Fortran and C:

435.gromacs: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
-prof-use(pass 2) -opt-prefetch -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xAVX -ipo -O3 -no-prec-div -auto-ilp32

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.html
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-revD.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-revD.xml

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