# SPEC® CFP2006 Result
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## Hewlett-Packard Company

ProLiant DL580 Gen8
(2.80 GHz, Intel Xeon E7-4890 v2)

SPECfp®_rate2006 = 1730

SPECfp_rate_base2006 = 1690
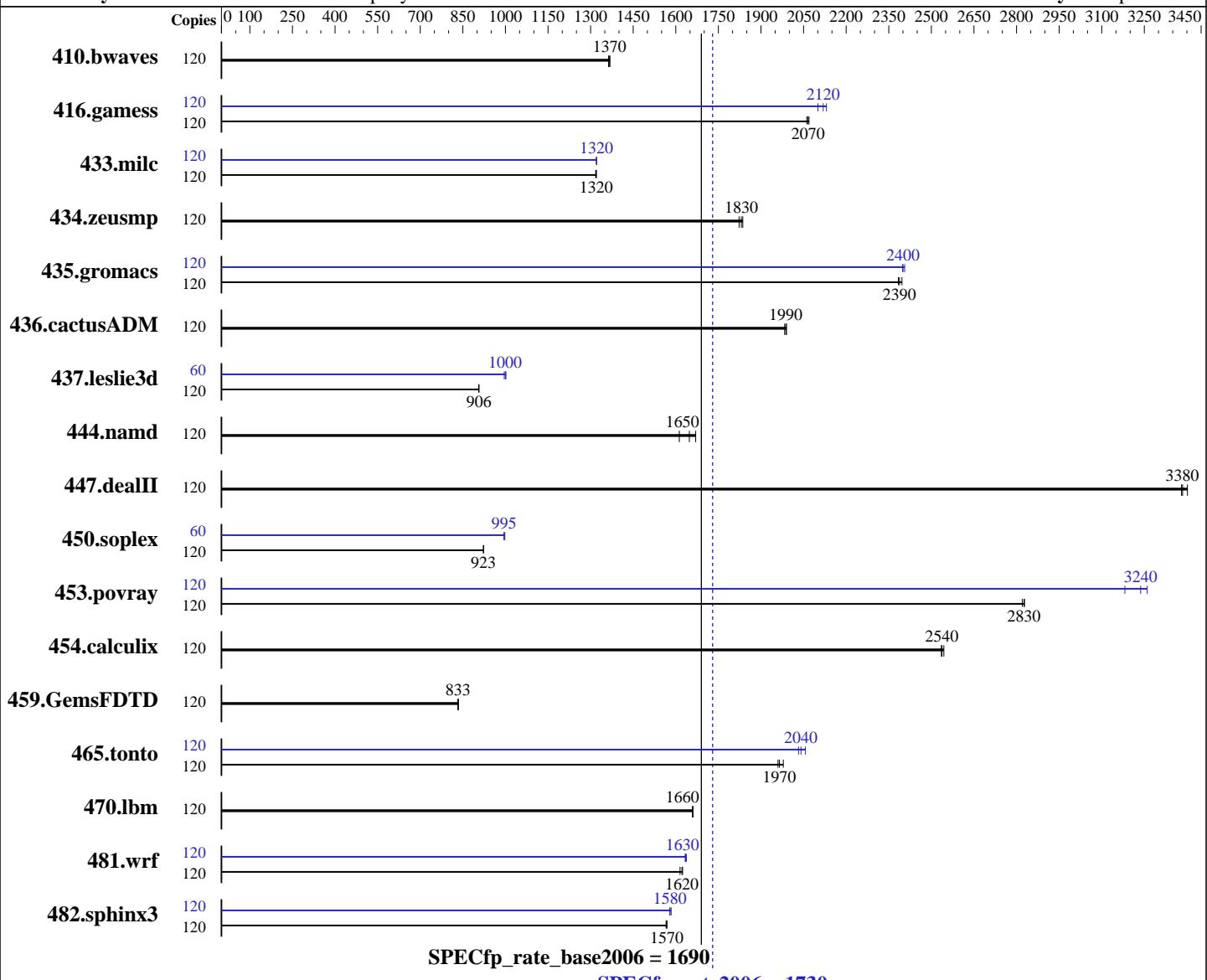
| | |
|---|---|
| **CPU2006 license:** 3 | **Test date:** Feb-2014 |
| **Test sponsor:** Hewlett-Packard Company | **Hardware Availability:** Feb-2014 |
| **Tested by:** Hewlett-Packard Company | **Software Availability:** Sep-2013 |



Copies | 0 100 250 400 550 700 850 1000 1150 1300 1450 1600 1750 1900 2050 2200 2350 2500 2650 2800 2950 3100 3250 3450

- **410.bwaves** 120 — 1370
- **416.gamess** 120 — 2120 / 120 — 2070
- **433.milc** 120 — 1320 / 120 — 1320
- **434.zeusmp** 120 — 1830
- **435.gromacs** 120 — 2400 / 120 — 2390
- **436.cactusADM** 120 — 1990
- **437.leslie3d** 60 — 1000 / 120 — 906
- **444.namd** 120 — 1650
- **447.dealII** 120 — 3380
- **450.soplex** 60 — 995 / 120 — 923
- **453.povray** 120 — 3240 / 120 — 2830
- **454.calculix** 120 — 2540
- **459.GemsFDTD** 120 — 833
- **465.tonto** 120 — 2040 / 120 — 1970
- **470.lbm** 120 — 1660
- **481.wrf** 120 — 1630 / 120 — 1620
- **482.sphinx3** 120 — 1580 / 120 — 1570

SPECfp_rate_base2006 = 1690

SPECfp_rate2006 = 1730

## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E7-4890 v2 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 3.40 GHz |
| CPU MHz: | 2800 |
| FPU: | Integrated |
| CPU(s) enabled: | 60 cores, 4 chips, 15 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: | SUSE Linux Enterprise Server 11 (x86_64) SP3 Kernel 3.0.76-0.11-default |
| 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: | ext3 |
| System State: | Run level 3 (multi-user) |

**Continued on next page**

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| | | | |
|---|---|---|---|
| L3 Cache: | 37.5 MB I+D on chip per chip | Base Pointers: | 32/64-bit |
| Other Cache: | None | Peak Pointers: | 32/64-bit |
| Memory: | 1 TB (64 x 16 GB 2Rx4 PC3-14900R-13, ECC, running at 1333 MHz and CL9) | Other Software: | None |
| Disk Subsystem: | 2 x 500 GB SAS, 10 K RPM, RAID 1 | | |
| Other Hardware: | None | | |

## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 120 | 1196 | 1360 | **1193** | **1370** | 1192 | 1370 | 120 | 1196 | 1360 | **1193** | **1370** | 1192 | 1370 |
| 416.gamess | 120 | 1136 | 2070 | 1140 | 2060 | **1137** | **2070** | 120 | **1109** | **2120** | 1119 | 2100 | 1103 | 2130 |
| 433.milc | 120 | 836 | 1320 | **835** | **1320** | 834 | 1320 | 120 | 835 | 1320 | **834** | **1320** | 834 | 1320 |
| 434.zeusmp | 120 | 595 | 1840 | 599 | 1820 | **596** | **1830** | 120 | 595 | 1840 | 599 | 1820 | **596** | **1830** |
| 435.gromacs | 120 | **359** | **2390** | 358 | 2400 | 359 | 2380 | 120 | **357** | **2400** | 356 | 2410 | 357 | 2400 |
| 436.cactusADM | 120 | **722** | **1990** | 721 | 1990 | 723 | 1980 | 120 | **722** | **1990** | 721 | 1990 | 723 | 1980 |
| 437.leslie3d | 120 | **1244** | **906** | 1245 | 906 | 1244 | 907 | 60 | **564** | **1000** | 563 | 1000 | 566 | 996 |
| 444.namd | 120 | 576 | 1670 | **584** | **1650** | 597 | 1610 | 120 | 576 | 1670 | **584** | **1650** | 597 | 1610 |
| 447.dealII | 120 | **406** | **3380** | 404 | 3400 | 406 | 3380 | 120 | **406** | **3380** | 404 | 3400 | 406 | 3380 |
| 450.soplex | 120 | 1084 | 924 | 1085 | 922 | **1084** | **923** | 60 | 501 | 998 | **503** | **995** | 503 | 995 |
| 453.povray | 120 | 226 | 2820 | 226 | 2830 | **226** | **2830** | 120 | 201 | 3180 | **197** | **3240** | 196 | 3260 |
| 454.calculix | 120 | **390** | **2540** | 391 | 2540 | 389 | 2540 | 120 | **390** | **2540** | 391 | 2540 | 389 | 2540 |
| 459.GemsFDTD | 120 | 1526 | 834 | 1528 | 833 | **1528** | **833** | 120 | 1526 | 834 | 1528 | 833 | **1528** | **833** |
| 465.tonto | 120 | 602 | 1960 | **601** | **1970** | 597 | 1980 | 120 | 574 | 2060 | **579** | **2040** | 581 | 2030 |
| 470.lbm | 120 | **993** | **1660** | 994 | 1660 | 993 | 1660 | 120 | **993** | **1660** | 994 | 1660 | 993 | 1660 |
| 481.wrf | 120 | 825 | 1620 | **827** | **1620** | 830 | 1610 | 120 | 821 | 1630 | 819 | 1640 | **820** | **1630** |
| 482.sphinx3 | 120 | **1491** | **1570** | 1494 | 1570 | 1491 | 1570 | 120 | 1481 | 1580 | 1477 | 1580 | **1481** | **1580** |

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/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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$SPECfp\_rate2006 =$  1730

$SPECfp\_rate\_base2006 =$  1690

**CPU2006 license:** 3

**Test sponsor:** Hewlett-Packard Company

**Tested by:** Hewlett-Packard Company

**Test date:** Feb-2014

**Hardware Availability:** Feb-2014

**Software Availability:** Sep-2013

## Platform Notes

```
BIOS Configuration:
 HP Power Profile was set to Maximum Performance
 Thermal Configuration was set to Maximum Cooling
 Collaborative Power Control was set to Disabled
 Memory Double Refresh ate was set to Disabled
 Processor Power and Utilization Monitoring was set to Disabled
Sysinfo program /home/cpu2006/config/sysinfo.rev6874.hp
$Rev: 6874 $ $Date:: 2013-11-20 #$ e05b96ddac6c3d74bfe176502a0a2391
running on dl580-rwen Sun Feb 23 01:37:22 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 E7-4890 v2 @ 2.80GHz
      4 "physical id"s (chips)
      120 "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 : 15
      siblings  : 30
      physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
      physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
      physical 2: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
      physical 3: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
   cache size : 38400 KB

From /proc/meminfo
   MemTotal:       1058730268 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

/usr/bin/lsb_release -d
   SUSE Linux Enterprise Server 11 (x86_64)

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 11 (x86_64)
      VERSION = 11
      PATCHLEVEL = 3

uname -a:
   Linux dl580-rwen 3.0.76-0.11-default #1 SMP Fri Jun 14 08:21:43 UTC 2013
   (ccab990) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Feb 22 13:10 last=S

SPEC is set to: /home/cpu2006
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sdb3       ext3  275G  8.8G  265G   4% /
```

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## Platform Notes (Continued)

```
  Additional information from dmidecode:

    Warning: Use caution when you interpret this section. The 'dmidecode' program
    reads system data which is "intended to allow hardware to be accurately
    determined", but the intent may not be met, as there are frequent changes to
    hardware, firmware, and the "DMTF SMBIOS" standard.

    BIOS HP P79 02/14/2014
    Memory:
    64x HP 712383-081 16 GB 1866 MHz, configured at 1333 MHz
    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 1866 MHz, configured at 1333 MHz
```

## General Notes

```
  Environment variables set by runspec before the start of the run:
  LD_LIBRARY_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/home/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
    435.gromacs: -DSPEC_CPU_LP64 -nofor_main
```

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## Base Portability Flags (Continued)

```
   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 (except as noted below):
```
icc    -m64
```

```
482.sphinx3: icc -m32
```

C++ benchmarks (except as noted below):
```
icpc   -m64
```

```
450.soplex: icpc -m32
```

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

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# Peak Compiler Invocation (Continued)

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

# 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
```

# 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: -xAVX -ipo -O3 -no-prec-div -opt-mem-layout-trans=3
                   -unroll2
```

C++ benchmarks:

```
         444.namd: basepeak = yes

        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
```

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# Peak Optimization Flags (Continued)

Fortran benchmarks:

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-revB.20131009.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
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