# SPEC® CFP2006 Result
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## Hewlett Packard Enterprise
(Test Sponsor: HPE)

### ProLiant DL560 Gen10
(2.60 GHz, Intel Xeon Gold 6126)

$SPECfp^{®}\_rate2006 =$ **Not Run**

$SPECfp\_rate\_base2006 = 2200$

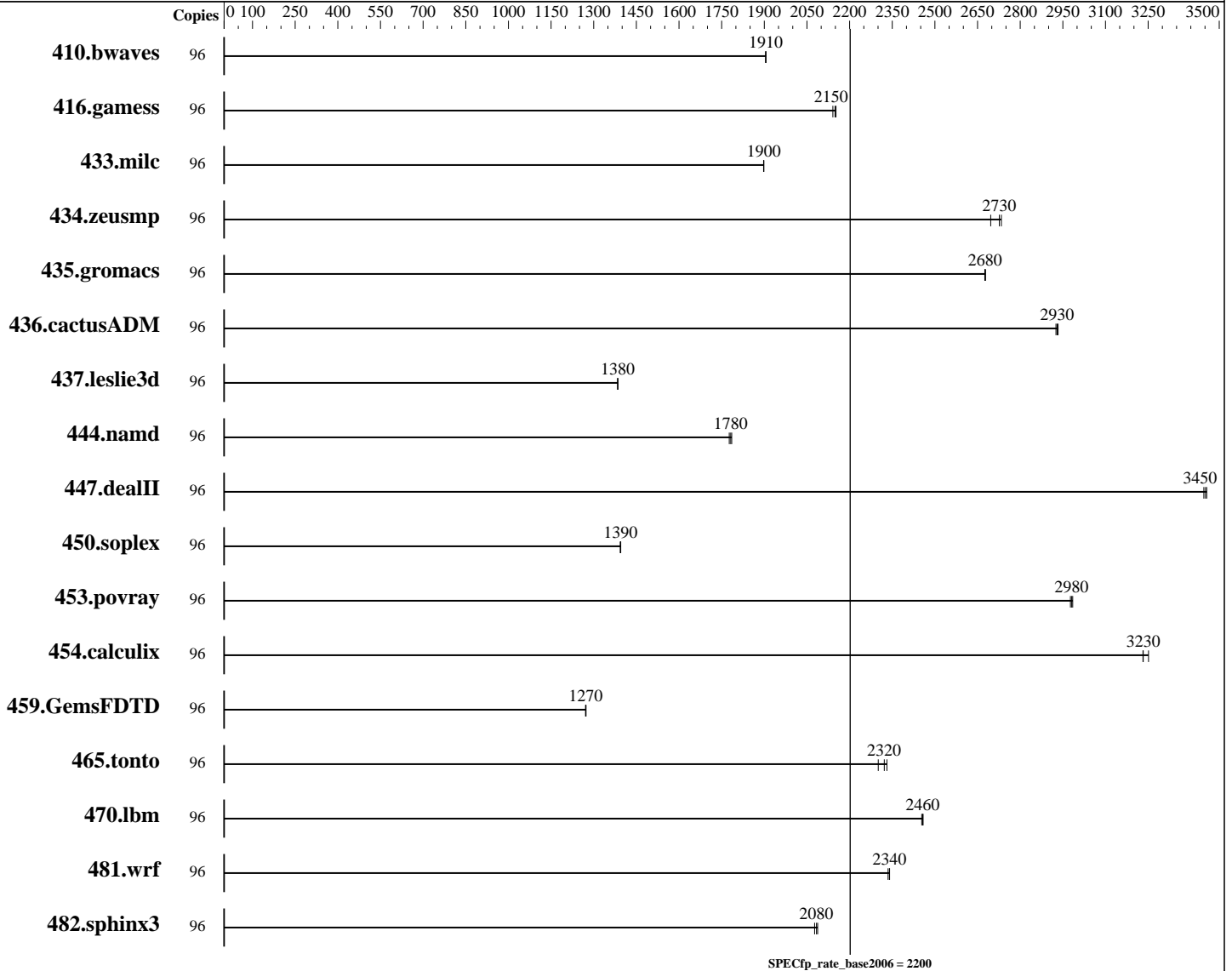| **CPU2006 license:** 3 | **Test date:** Dec-2017 |
|---|---|
| **Test sponsor:** HPE | **Hardware Availability:** Oct-2017 |
| **Tested by:** HPE | **Software Availability:** Apr-2017 |

Copies scale: 0 100 250 400 550 700 850 1000 1150 1300 1450 1600 1750 1900 2050 2200 2350 2500 2650 2800 2950 3100 3250 3500

| Benchmark | Copies | Result |
|---|---|---|
| 410.bwaves | 96 | 1910 |
| 416.gamess | 96 | 2150 |
| 433.milc | 96 | 1900 |
| 434.zeusmp | 96 | 2730 |
| 435.gromacs | 96 | 2680 |
| 436.cactusADM | 96 | 2930 |
| 437.leslie3d | 96 | 1380 |
| 444.namd | 96 | 1780 |
| 447.dealII | 96 | 3450 |
| 450.soplex | 96 | 1390 |
| 453.povray | 96 | 2980 |
| 454.calculix | 96 | 3230 |
| 459.GemsFDTD | 96 | 1270 |
| 465.tonto | 96 | 2320 |
| 470.lbm | 96 | 2460 |
| 481.wrf | 96 | 2340 |
| 482.sphinx3 | 96 | 2080 |

SPECfp_rate_base2006 = 2200

## Hardware
| | |
|---|---|
| CPU Name: | Intel Xeon Gold 6126 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 3.70 GHz |
| CPU MHz: | 2600 |
| FPU: | Integrated |
| CPU(s) enabled: | 48 cores, 4 chips, 12 cores/chip, 2 threads/core |
| CPU(s) orderable: | 1, 2, 4 chip(s) |
| Primary Cache: | 32 KB I + 32 KB D on chip per core |
| Secondary Cache: | 1 MB I+D on chip per core |

**Continued on next page**

## Software
| | |
|---|---|
| Operating System: | SUSE Linux Enterprise Server 12 (x86_64) SP2 Kernel 4.4.21-68-default |
| Compiler: | C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux; Fortran: Version 17.0.3.191 of Intel Fortran Compiler for Linux |
| Auto Parallel: | No |
| File System: | xfs |
| System State: | Run level 3 (multi-user) |

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| | | | |
|---|---|---|---|
| L3 Cache: | 19.25 MB I+D on chip per chip | Base Pointers: | 32/64-bit |
| Other Cache: | None | Peak Pointers: | Not Applicable |
| Memory: | 384 GB (48 x 8 GB 2Rx8 PC4-2666V-R) | Other Software: | None |
| Disk Subsystem: | 1 x 960 GB SATA SSD, 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 | 96 | 685 | 1900 | 685 | 1910 | **685** | **1910** | | | | | | | |
| 416.gamess | 96 | 873 | 2150 | 878 | 2140 | **875** | **2150** | | | | | | | |
| 433.milc | 96 | 464 | 1900 | **464** | **1900** | 464 | 1900 | | | | | | | |
| 434.zeusmp | 96 | 320 | 2730 | **320** | **2730** | 324 | 2700 | | | | | | | |
| 435.gromacs | 96 | 256 | 2680 | 256 | 2680 | **256** | **2680** | | | | | | | |
| 436.cactusADM | 96 | 391 | 2930 | 392 | 2930 | **392** | **2930** | | | | | | | |
| 437.leslie3d | 96 | 652 | 1380 | **652** | **1380** | 652 | 1380 | | | | | | | |
| 444.namd | 96 | **432** | **1780** | 433 | 1780 | 431 | 1790 | | | | | | | |
| 447.dealII | 96 | **318** | **3450** | 319 | 3450 | 318 | 3460 | | | | | | | |
| 450.soplex | 96 | 575 | 1390 | **574** | **1390** | 574 | 1400 | | | | | | | |
| 453.povray | 96 | 171 | 2980 | 172 | 2980 | **171** | **2980** | | | | | | | |
| 454.calculix | 96 | 244 | 3250 | 245 | 3230 | **245** | **3230** | | | | | | | |
| 459.GemsFDTD | 96 | 801 | 1270 | **801** | **1270** | 800 | 1270 | | | | | | | |
| 465.tonto | 96 | 411 | 2300 | **407** | **2320** | 405 | 2330 | | | | | | | |
| 470.lbm | 96 | **537** | **2460** | 538 | 2450 | 537 | 2460 | | | | | | | |
| 481.wrf | 96 | **458** | **2340** | 458 | 2340 | 459 | 2340 | | | | | | | |
| 482.sphinx3 | 96 | **898** | **2080** | 901 | 2080 | 896 | 2090 | | | | | | | |

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 by default
   Filesystem page cache cleared with:
    shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
   runspec command invoked through numactl i.e.:
    numactl --interleave=all runspec <etc>
   irqbalance disabled with "systemctl stop irqbalance"
   tuned profile set with "tuned-adm profile throughput-performance"

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**CPU2006 license:** 3
**Test sponsor:** HPE
**Tested by:** HPE

**Test date:** Dec-2017
**Hardware Availability:** Oct-2017
**Software Availability:** Apr-2017

## Operating System Notes (Continued)

```
VM Dirty ratio was set to 40 using  "echo 40 > /proc/sys/vm/dirty_ratio"
Numa balancing was disabled using "echo 0 > /proc/sys/kernel/numa_balancing"
```

## Platform Notes

```
BIOS Configuration:
 Thermal Configuration set to Maximum Cooling
 Memory Patrol Scrubbing set to Disabled
 LLC Prefetch set to Enabled
 LLC Dead Line Allocation set to Disabled
 Workload Profile set to General Throughput Compute
  Minimum Processor Idle Power Core C-State set to C1E State
Sysinfo program /home/cpu2006/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on linux-mcua Thu Dec 14 18:58:24 2017

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) Gold 6126 CPU @ 2.60GHz
      4 "physical id"s (chips)
      96 "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 : 12
      siblings  : 24
      physical 0: cores 0 2 3 4 5 8 9 10 11 12 13 14
      physical 1: cores 0 1 3 5 6 8 9 10 11 12 13 14
      physical 2: cores 0 1 3 4 5 6 8 9 10 11 12 13
      physical 3: cores 0 1 3 4 5 6 8 9 10 11 12 13
   cache size : 19712 KB

From /proc/meminfo
   MemTotal:       395918104 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 2
      # This file is deprecated and will be removed in a future service pack or
      release.
      # Please check /etc/os-release for details about this release.
   os-release:
      NAME="SLES"
      VERSION="12-SP2"
```

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$SPECfp\_rate\_base2006 = $  2200

**CPU2006 license:** 3
**Test sponsor:**   HPE
**Tested by:**      HPE

**Test date:**            Dec-2017
**Hardware Availability:** Oct-2017
**Software Availability:** Apr-2017

## Platform Notes (Continued)

```
         VERSION_ID="12.2"
         PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
         ID="sles"
         ANSI_COLOR="0;32"
         CPE_NAME="cpe:/o:suse:sles:12:sp2"

   uname -a:
      Linux linux-mcua 4.4.21-68-default #1 SMP Tue Oct 18 18:19:37 UTC 2016
      (63cf368) x86_64 x86_64 x86_64 GNU/Linux

   run-level 3 Dec 14 14:08

   SPEC is set to: /home/cpu2006
      Filesystem      Type  Size  Used Avail Use% Mounted on
      /dev/sdb4       xfs   852G  115G  738G  14% /home
   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 HPE U34 09/29/2017
      Memory:
      48x UNKNOWN NOT AVAILABLE 8 GB 2 rank 2666 MHz

   (End of data from sysinfo program)
```

## General Notes

```
 Environment variables set by runspec before the start of the run:
 LD_LIBRARY_PATH = "/home/cpu2006/lib/ia32:/home/cpu2006/lib/intel64:/home/cpu2006/sh10.2"

  Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
  memory using Redhat Enterprise Linux 7.2

 No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
 is mitigated in the system as tested and documented.
 No: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)
 is mitigated in the system as tested and documented.
 No: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
 is mitigated in the system as tested and documented.


 This benchmark result is intended to provide perspective on
 past performance using the historical hardware and/or
 software described on this result page.

 The system as described on this result page was formerly
 generally available. At the time of this publication, it may
 not be shipping, and/or may not be supported, and/or may fail
```

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## General Notes (Continued)

to meet other tests of General Availability described in the
SPEC OSG Policy document, http://www.spec.org/osg/policy.htm.

This measured result may not be representative of the result
that would be measured were this benchmark run with hardware
and software available as of the publication date.

## 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
     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:
    -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
    -qopt-mem-layout-trans=3

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# Base Optimization Flags (Continued)

C++ benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3
```

Fortran benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
```

Benchmarks using both Fortran and C:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3
```

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revF.html
http://www.spec.org/cpu2006/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revF.xml
http://www.spec.org/cpu2006/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.xml

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

Tested with SPEC CPU2006 v1.2.
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