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

ProLiant BL460c Gen10
(1.70 GHz, Intel Xeon Bronze 3106)

$SPECfp^®\_rate2006 =$ Not Run

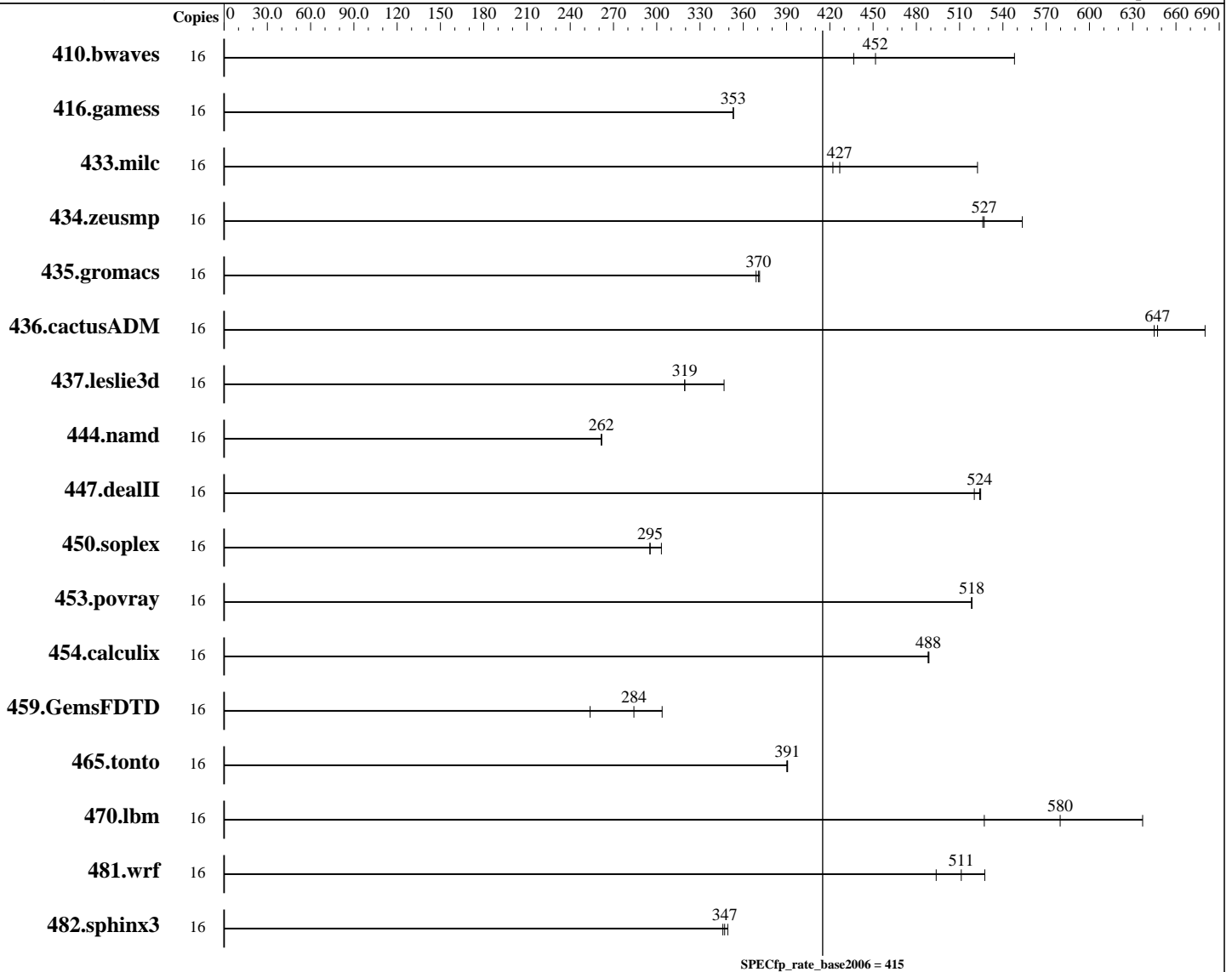SPECfp_rate_base2006 = 415

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

Copies

| Benchmark | Copies | Result |
|---|---|---|
| 410.bwaves | 16 | 452 |
| 416.gamess | 16 | 353 |
| 433.milc | 16 | 427 |
| 434.zeusmp | 16 | 527 |
| 435.gromacs | 16 | 370 |
| 436.cactusADM | 16 | 647 |
| 437.leslie3d | 16 | 319 |
| 444.namd | 16 | 262 |
| 447.dealII | 16 | 524 |
| 450.soplex | 16 | 295 |
| 453.povray | 16 | 518 |
| 454.calculix | 16 | 488 |
| 459.GemsFDTD | 16 | 284 |
| 465.tonto | 16 | 391 |
| 470.lbm | 16 | 580 |
| 481.wrf | 16 | 511 |
| 482.sphinx3 | 16 | 347 |

SPECfp_rate_base2006 = 415

## Hardware
| | |
|---|---|
| CPU Name: | Intel Xeon Bronze 3106 |
| CPU Characteristics: | |
| CPU MHz: | 1700 |
| FPU: | Integrated |
| CPU(s) enabled: | 16 cores, 2 chips, 8 cores/chip |
| CPU(s) orderable: | 1, 2 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 3.10.0-693.e17.x86_64 |
| 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: | 11 MB I+D on chip per chip | Base Pointers: | 32/64-bit |
| Other Cache: | None | Peak Pointers: | Not Applicable |
| Memory: | 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2133) | Other Software: | None |
| Disk Subsystem: | 1 x 480 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 | 16 | **481** | **452** | 498 | 437 | 397 | 548 | | | | | | | |
| 416.gamess | 16 | 887 | 353 | **887** | **353** | 888 | 353 | | | | | | | |
| 433.milc | 16 | **344** | **427** | 348 | 422 | 281 | 522 | | | | | | | |
| 434.zeusmp | 16 | **276** | **527** | 277 | 526 | 263 | 553 | | | | | | | |
| 435.gromacs | 16 | 308 | 371 | 310 | 369 | **308** | **370** | | | | | | | |
| 436.cactusADM | 16 | **295** | **647** | 296 | 645 | 281 | 680 | | | | | | | |
| 437.leslie3d | 16 | 471 | 319 | **471** | **319** | 434 | 347 | | | | | | | |
| 444.namd | 16 | 490 | 262 | 491 | 262 | **491** | **262** | | | | | | | |
| 447.dealII | 16 | 352 | 520 | 349 | 525 | **349** | **524** | | | | | | | |
| 450.soplex | 16 | **452** | **295** | 452 | 295 | 440 | 303 | | | | | | | |
| 453.povray | 16 | 164 | 518 | 164 | 519 | **164** | **518** | | | | | | | |
| 454.calculix | 16 | 270 | 489 | **270** | **488** | 270 | 488 | | | | | | | |
| 459.GemsFDTD | 16 | 669 | 254 | **597** | **284** | 559 | 304 | | | | | | | |
| 465.tonto | 16 | 404 | 390 | 403 | 391 | **403** | **391** | | | | | | | |
| 470.lbm | 16 | 417 | 527 | **379** | **580** | 345 | 637 | | | | | | | |
| 481.wrf | 16 | 362 | 494 | **350** | **511** | 339 | 527 | | | | | | | |
| 482.sphinx3 | 16 | 893 | 349 | 902 | 346 | **898** | **347** | | | | | | | |

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"

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## Operating System Notes (Continued)

```
tuned profile set with "tuned-adm profile throughput-performance"
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
 Workload Profile set to Custom
  Sub-NUMA Clustering set to Disabled
Sysinfo program /home/cpu2006/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on linux-h3xn Thu Dec 14 22:46:51 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) Bronze 3106 CPU @ 1.70GHz
      2 "physical id"s (chips)
      16 "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 : 8
      siblings  : 8
      physical 0: cores 0 1 2 3 4 5 6 7
      physical 1: cores 0 1 2 3 4 5 6 7
   cache size : 11264 KB

From /proc/meminfo
   MemTotal:       197621936 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

/usr/bin/lsb_release -d
   SUSE Linux Enterprise Server 12 SP2

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.
```

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## Platform Notes (Continued)

```
     # Please check /etc/os-release for details about this release.
   os-release:
      NAME="SLES"
      VERSION="12-SP2"
      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-h3xn 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016
    (9464f67) x86_64 x86_64 x86_64 GNU/Linux

 run-level 3 Dec 14 15:39

 SPEC is set to: /home/cpu2006
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda4      xfs   405G  112G  293G  28% /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 I41 09/29/2017
    Memory:
    4x UNKNOWN NOT AVAILABLE
    12x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666 MHz, configured at 2133 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
```

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**Hardware Availability:** Oct-2017
**Software Availability:** Sep-2017

## General Notes (Continued)

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
to meet other tests of General Availability described in the
SPEC OSG Policy document, http://wwww.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

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# Base Optimization Flags

C benchmarks:

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

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

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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

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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

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For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.2.
Report generated on Thu Jun 14 11:29:25 2018 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 13 June 2018.