## SPEC® CFP2006 Result

### Hewlett Packard Enterprise

**(Test Sponsor: HPE)**

**ProLiant DL560 Gen10**

*(2.40 GHz, Intel Xeon Gold 6148)*

**SPECfp\(^\circ\)_rate2006 = Not Run**

**SPECfp\(_{rate}\)_base2006 = 2800**

<table>
<thead>
<tr>
<th><strong>Software</strong></th>
</tr>
</thead>
</table>
| **Operating System**: SUSE Linux Enterprise Server 12 (x86_64) SP2  
**Kernel**: 4.4.21-69-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) |

<table>
<thead>
<tr>
<th><strong>Hardware</strong></th>
</tr>
</thead>
</table>
| **CPU Name**: Intel Xeon Gold 6148  
**CPU Characteristics**: Intel Turbo Boost Technology up to 3.70 GHz  
**CPU MHz**: 2400  
**FPU**: Integrated  
**CPU(s) enabled**: 80 cores, 4 chips, 20 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 | **Software** |

| **Test date**: Nov-2017  
**Hardware Availability**: Oct-2017  
**Software Availability**: Apr-2017 | **Test date**: Nov-2017  
**Hardware Availability**: Oct-2017  
**Software Availability**: Apr-2017 |

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

| **Copies** | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 | 2000 | 2200 | 2400 | 2600 | 2800 | 3000 | 3200 | 3400 | 3600 | 3800 | 4000 | 4200 | 4400 | 4600 | 5000 | 6000 |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 410.bwaves | 160 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 416.gamess | 160 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 433.milc  | 160 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 434.zeusmp| 160 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 435.gromacs| 160 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 436.cactusADM | 160 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 437.leslie3d| 160 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 444.namd   | 160 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 447.dealII | 160 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 450.soplex | 160 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 453.povray | 160 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 454.calculix| 160 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 459.GemsFDTD| 160 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 465.tonto  | 160 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 470.lbm    | 160 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 481.wrf    | 160 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 482.sphinx3| 160 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |

| **SPECfp\(_{rate}\)_base2006 = 2800** | **SPECfp\(_{rate}\)_base2006 = 2800** |

<table>
<thead>
<tr>
<th><strong>Computer Name</strong>:</th>
<th><strong>Computer Name</strong>:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel Xeon Gold 6148</td>
<td>Intel Xeon Gold 6148</td>
</tr>
<tr>
<td>Intel Turbo Boost Technology up to 3.70 GHz</td>
<td>Intel Turbo Boost Technology up to 3.70 GHz</td>
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<tr>
<td>2400 MHz</td>
<td>2400 MHz</td>
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<tr>
<td>Integrated</td>
<td>Integrated</td>
</tr>
<tr>
<td>80 cores, 4 chips, 20 cores/chip, 2 threads/core</td>
<td>80 cores, 4 chips, 20 cores/chip, 2 threads/core</td>
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<tr>
<td>1, 2, 4 chip(s)</td>
<td>1, 2, 4 chip(s)</td>
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<tr>
<td>32 KB I + 32 KB D on chip per core</td>
<td>32 KB I + 32 KB D on chip per core</td>
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<tr>
<td>1 MB I+D on chip per core</td>
<td>1 MB I+D on chip per core</td>
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</table>

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**SPEC CFP2006 Result**

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)
ProLiant DL560 Gen10
(2.40 GHz, Intel Xeon Gold 6148)

**SPECfp_rate2006 = Not Run**
SPECfp_rate_base2006 = 2800

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

| L3 Cache: | 27.5 MB I+D on chip per chip |
| Other Cache: | None |
| Memory: | 768 GB (48 x 16 GB 2Rx8 PC4-2666V-R) |
| Disk Subsystem: | 2 x 480 GB SATA SSD, RAID 0 |
| Other Hardware: | None |

| Base Pointers: | 32/64-bit |
| Peak Pointers: | No Applicable |
| Other Software: | None |

**Results Table**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Ratio</th>
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<tbody>
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</tbody>
</table>

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  
runcspec command invoked through numactl i.e.:  
numactl --interleave=all runspec <etc>  
irqbalance disabled with "service irqbalance stop"  
tuned profile set with "tuned-adm profile throughput-performance"

Continued on next page
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL560 Gen10
(2.40 GHz, Intel Xeon Gold 6148)

SPECfp_rate2006 = Not Run
SPECfp_rate_base2006 = 2800

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
- LLC Prefetch set to Enabled
- LLC Dead Line Allocation set to Disabled
- Stale A to S set to Enabled
- Memory Patrol Scrubbing 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-e6az Wed Nov 29 16:48:25 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 6148 CPU @ 2.40GHz
  4 "physical id"s (chips)
  160 "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 : 20
  siblings : 40
  physical 0: cores 0 1 2 3 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  physical 1: cores 0 1 2 3 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  physical 2: cores 0 1 2 3 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  physical 3: cores 0 1 2 3 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  cache size : 28160 KB

From /proc/meminfo
  MemTotal:       792269984 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.
SPEC CFP2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL560 Gen10
(2.40 GHz, Intel Xeon Gold 6148)

SPECfp_rate2006 = Not Run
SPECfp_rate_base2006 = 2800

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

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:
(9464f67) x86_64 x86_64 x86_64 GNU/Linux
run-level 3 Nov 29 11:16

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 16 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

Base Compiler Invocation

C benchmarks:
  icc -m64

C++ benchmarks:
  icpc -m64

Continued on next page
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SPECfp_rate2006 =  Not Run
SPECfp_rate_base2006 = 2800

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

Base Compiler Invocation (Continued)

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

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
## SPEC CFP2006 Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL560 Gen10  
(2.40 GHz, Intel Xeon Gold 6148)

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<thead>
<tr>
<th>CPU2006 license: 3</th>
<th>Test date: Nov-2017</th>
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</thead>
<tbody>
<tr>
<td>Test sponsor: HPE</td>
<td>Hardware Availability: Oct-2017</td>
</tr>
<tr>
<td>Tested by: HPE</td>
<td>Software Availability: Apr-2017</td>
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</tbody>
</table>

**SPECfp_rate2006 = Not Run**  
**SPECfp_rate_base2006 = 2800**

The flags files that were used to format this result can be browsed at  
[http://www.spec.org/cpu2006/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.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/HPE-Platform-Flags-Intel-V1.2-SKX-revH.xml](http://www.spec.org/cpu2006/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.xml)

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

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