**SPEC® CFP2006 Result**

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL560 Gen10  
(3.50 GHz, Intel Xeon Gold 6144)  

<table>
<thead>
<tr>
<th>SPECfp®2006</th>
<th>Not Run</th>
</tr>
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<tbody>
<tr>
<td>SPECfp_base2006</td>
<td>128</td>
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</table>

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

<table>
<thead>
<tr>
<th>Test</th>
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<tbody>
<tr>
<td>410.bwaves</td>
<td>50.9</td>
</tr>
<tr>
<td>416.gamess</td>
<td>88.4</td>
</tr>
<tr>
<td>433.milc</td>
<td>190</td>
</tr>
<tr>
<td>434.zeusmp</td>
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<tr>
<td>435.gromacs</td>
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</tr>
<tr>
<td>436.cactusADM</td>
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<tr>
<td>437.leslie3d</td>
<td>227</td>
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<tr>
<td>444.namd</td>
<td>40.3</td>
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<tr>
<td>447.dealII</td>
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<tr>
<td>450.soplex</td>
<td>48.8</td>
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<td>459.GemsFDTD</td>
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<td>470.lbm</td>
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**Software**

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
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<tbody>
<tr>
<td>Operating System</td>
<td>Red Hat Enterprise Linux Server release 7.3 (Maipo)</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux</td>
</tr>
<tr>
<td>Auto Parallel</td>
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<tr>
<td>File System</td>
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</tr>
<tr>
<td>System State</td>
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<tr>
<td>Base Pointers</td>
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</table>

**Hardware**

<table>
<thead>
<tr>
<th>Component</th>
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<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Gold 6144</td>
</tr>
<tr>
<td>CPU Characteristics</td>
<td>Intel Turbo Boost Technology up to 4.20 GHz</td>
</tr>
<tr>
<td>CPU MHz</td>
<td>3500</td>
</tr>
<tr>
<td>FPU</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled:</td>
<td>32 cores, 4 chips, 8 cores/chip, 2 threads/core</td>
</tr>
<tr>
<td>CPU(s) orderable:</td>
<td>1, 2, 4 chip(s)</td>
</tr>
<tr>
<td>Primary Cache</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Secondary Cache</td>
<td>1 MB I+D on chip per core</td>
</tr>
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</table>
### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td><strong>67.7</strong></td>
<td>285</td>
<td>68.4</td>
<td>289</td>
<td>67.3</td>
</tr>
</tbody>
</table>

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

### 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
- irqbalance disabled with "systemctl stop irqbalance"
- tuned profile set with "tuned-adm profile throughput-performance"

### 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
SPEC CFP2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL560 Gen10
(3.50 GHz, Intel Xeon Gold 6144)

<table>
<thead>
<tr>
<th>CPU2006 license</th>
<th>SPECfp2006</th>
<th>TEST date</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Not Run</td>
<td>Dec-2017</td>
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</table>

<table>
<thead>
<tr>
<th>Test sponsor</th>
<th>SPECfp_base2006</th>
<th>Hardware Availability</th>
<th>Software Availability</th>
</tr>
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<tbody>
<tr>
<td>HPE</td>
<td>128</td>
<td>Oct-2017</td>
<td>Sep-2017</td>
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</tbody>
</table>

Test date: Dec-2017
Hardware Availability: Oct-2017
Software Availability: Sep-2017

Test sponsor: HPE
Hardware Availability: Oct-2017
Software Availability: Sep-2017

Tested by: HPE

Platform Notes (Continued)

Memory Patrol Scrubbing set to Disabled
Workload Profile set to General Peak Frequency Compute
Energy/Performance Bias set to Maximum Performance
Workload Profile set to Custom
NUMA Group Size Optimization set to Flat
Sysinfo program /home/cpu2006/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on RHEL7.3-DQW Mon Dec 11 15:48:49 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 6144 CPU @ 3.50GHz
- 4 "physical id"s (chips)
- 64 "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 : 16
- physical 0: cores 0 2 3 9 16 19 26 27
- physical 1: cores 0 2 3 9 16 19 26 27
- physical 2: cores 0 2 3 9 16 19 26 27
- physical 3: cores 0 2 3 9 16 19 26 27
- cache size : 25344 KB

From /proc/meminfo

- MemTotal: 792071360 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*

- os-release:
  NAME="Red Hat Enterprise Linux Server"
  VERSION="7.3 (Maipo)"
  ID="rhel"
  ID_LIKE="fedora"
  VERSION_ID="7.3"
  PRETTY_NAME="Red Hat Enterprise Linux Server 7.3 (Maipo)"
  ANSI_COLOR="0;31"
  CPE_NAME=cpe:/o:redhat:enterprise_linux:7.3:GA:server
  redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
  system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)

uname -a:

Linux RHEL7.3-DQW 3.10.0-514.e17.x86_64 #1 SMP Wed Oct 19 11:24:13 EDT 2016
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Dec 8 11:51

Continued on next page
SPEC CFP2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL560 Gen10
(3.50 GHz, Intel Xeon Gold 6144)

SPECfp2006 = Not Run
SPECfp_base2006 = 128

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

Platform Notes (Continued)

SPEC is set to: /home/cpu2006
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 442G 25G 418G 6% /

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:
KMP_AFFINITY = "granularity=core,compact"
LD_LIBRARY_PATH = "/home/cpu2006/lib/ia32:/home/cpu2006/lib/intel64:/home/cpu2006/sh10.2"
OMP_NUM_THREADS = "64"

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 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.
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ProLiant DL560 Gen10
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SPECfp_base2006 = 128

CPU2006 license: 3
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Test date: Dec-2017
Hardware Availability: Oct-2017
Software Availability: Sep-2017

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.game5s: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zgams: -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 -parallel -qopt-prefetch

C++ benchmarks:
  -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch

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

Benchmarks using both Fortran and C:
  -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch
<table>
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<tr>
<th>Specification</th>
<th>Result</th>
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<td>HPE</td>
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<td>Tested by</td>
<td>HPE</td>
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</table>

测试日期: Dec-2017  
硬件可用性: Oct-2017  
软件可用性: Sep-2017

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

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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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