Hewlett Packard Enterprise  
(Test Sponsor: HPE)

ProLiant BL460c Gen10  
(2.00 GHz, Intel Xeon Gold 6138)

| SPECfp®2006 = | Not Run |
| SPECfp_base2006 = | 134 |

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

### Hardware
- **CPU Name:** Intel Xeon Gold 6138  
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.70 GHz  
- **CPU MHz:** 2000  
- **FPU:** Integrated  
- **CPU(s) enabled:** 40 cores, 2 chips, 20 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

### Software
- **Operating System:** Red Hat Enterprise Linux Server release 7.4 (Maipo)  
- **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:** Yes  
- **File System:** xfs

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HPC Benchmarks: 410.bwaves  
416.gamess  
433.milc  
434.zeusmp  
435.gromacs  
436.cactusADM  
437.leslie3d  
444.namd  
447.dealII  
450.soplex  
453.povray  
454.calculix  
459.GemsFDTD  
465.tonto  
470.lbm  
481.wrf  
482.sphinx3

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Continued on next page
## SPEC CFP2006 Result

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**SPECfp2006** = Not Run  
**SPECfp_base2006** = 134

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>CPU2006 license: 3</th>
<th>Test sponsor: HPE</th>
<th>Tested by: HPE</th>
<th>L3 Cache: 27.5 MB I+D on chip per chip</th>
<th>Other Cache: None</th>
<th>Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R)</th>
<th>Disk Subsystem: 1 x 480 GB SATA SSD, RAID 0</th>
<th>Other Hardware: None</th>
<th>System State: Run level 3 (multi-user)</th>
<th>Base Pointers: 64-bit</th>
<th>Peak Pointers: Not Applicable</th>
<th>Other Software: None</th>
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<tr>
<td><strong>410.bwaves</strong></td>
<td>15.0</td>
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</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:  
Intel Hyper-Threading set to Disabled  
Thermal Configuration set to Maximum Cooling  
LLC Prefetch set to Enabled  
LLC Dead Line Allocation set to Disabled
**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  
Uncore Frequency Scaling set to Auto  
Sysinfo program /home/cpu2006/config/sysinfo.rev6993  
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)  
running on bl160c15 Mon Dec 11 16:32:02 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 6138 CPU @ 2.00GHz  
2 "physical id"s (chips)  
40 "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 : 20  
physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28  
physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28  
cache size : 28160 KB  

From /proc/meminfo  
MemTotal: 197748184 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB  

From /etc/*release* /etc/*version*  
os-release:  
NAME="Red Hat Enterprise Linux Server"  
VERSION="7.4 (Maipo)"  
ID="rhel"  
ID_LIKE="fedora"  
VARIANT="Server"  
VARIANT_ID="server"  
VERSION_ID="7.4"  
PRETTY_NAME="Red Hat Enterprise Linux Server 7.4 (Maipo)"  
redhat-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)  
system-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)  
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server  
uname -a:  
Linux bl160c15 3.10.0-693.el7.x86_64 #1 SMP Thu Jul 6 19:56:57 EDT 2017  
x86_64 x86_64 x86_64 GNU/Linux  
run-level 3 Dec 11 14:15  

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SPEC CFP2006 Result

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SPECfp2006 = Not Run
SPECfp_base2006 = 134

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

Platform Notes (Continued)

SPEC is set to: /home/cpu2006
Filesystem               Type  Size  Used  Avail  Use%  Mounted on
/dev/mapper/rhel-home   xfs   839G   38G  802G   5%  /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 11/14/2017
Memory:
4x UNKNOWN NOT AVAILABLE
12x 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 = "40"

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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**SPEC CFP2006 Result**

| SPECfp2006 = | Not Run |
| SPECfp_base2006 = | 134 |

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

**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 -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`
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<th>CPU2006 license</th>
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<td>HPE</td>
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SPECfp2006 = Not Run
SPECfp_base2006 = 134

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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