**SPEC® CFP2006 Result**

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL560 Gen10  
(2.20 GHz, Intel Xeon Gold 5120)

<table>
<thead>
<tr>
<th>Test date:</th>
<th>Dec-2017</th>
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**CPU2006 license:** 3  
**Test sponsor:** HPE  
**Tested by:** HPE

**SPECfp®2006 =** Not Run  
**SPECfp_base2006 =** 110

### Hardware

- **CPU Name:** Intel Xeon Gold 5120  
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.20 GHz  
- **CPU MHz:** 2200  
- **FPU:** Integrated  
- **CPU(s) enabled:** 56 cores, 4 chips, 14 cores/chip  
- **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

- **Operating System:** Red Hat Enterprise Linux Server release 7.3 (Maipo)  
- **Kernel:** 3.10.0-514.el7.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:** Yes  
- **File System:** xfs

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L3 Cache: 19.25 MB I+D on chip per chip
Other Cache: None
Memory: 384 GB (48 x 8 GB 2Rx8 PC4-2666V-R, running at 2400)
Disk Subsystem: 1 x 960 GB SATA SSD, RAID 0
Other Hardware: None

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

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Platform Notes (Continued)

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 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 DL560G10 Mon Dec 18 06:19:16 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 5120 CPU @ 2.20GHz
  4 "physical id"s (chips)
  56 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The
following excerpts from /proc/cpuinfo might not be reliable. Use with
cautions.)
  cpu cores : 14
  siblings : 14
  physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
  physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
  physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
  physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
  cache size : 19712 KB

From /proc/meminfo
  MemTotal: 395927204 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 DL560G10 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

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Platform Notes (Continued)

run-level 3 Dec 18 03:47

SPEC is set to: /home/cpu2006
Filesystem                     Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel_dl560g10-home xfs   839G   30G  810G   4% /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, configured at 2400 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 = "56"

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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**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`

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**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 -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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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

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

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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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