# SPEC® CFP2006 Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL560 Gen10  
(2.10 GHz, Intel Xeon Platinum 8170)  

<table>
<thead>
<tr>
<th>SPECfp®2006</th>
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<tr>
<td>SPECfp_base2006</td>
<td>128</td>
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</table>

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

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

### Hardware
- **CPU Name:** Intel Xeon Platinum 8170  
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.70 GHz  
- **CPU MHz:** 2100  
- **FPU:** Integrated  
- **CPU(s) enabled:** 104 cores, 4 chips, 26 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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info@spec.org  
http://www.spec.org/
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L3 Cache: 35.75 MB I+D on chip per chip
Other Cache: None
Memory: 768 GB (48 x 16 GB 2Rx8 PC4-2666V-R)
Disk Subsystem: 1 x 480 GB SATA SSD, RAID 0
Other Hardware: None

System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other Software: None

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds Base</th>
<th>Seconds Peak</th>
<th>Seconds Base</th>
<th>Seconds Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>9.21</td>
<td>1480</td>
<td>9.07</td>
<td>1500</td>
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<tr>
<td>416.gamess</td>
<td>397</td>
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<td>397</td>
<td>49.3</td>
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<td>433.milc</td>
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<tr>
<td>434.zeusmp</td>
<td>42.1</td>
<td>216</td>
<td>41.6</td>
<td>219</td>
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<tr>
<td>435.gromacs</td>
<td>168</td>
<td>42.4</td>
<td>169</td>
<td>42.4</td>
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<tr>
<td>436.cactusADM</td>
<td>30.0</td>
<td>398</td>
<td>28.8</td>
<td>414</td>
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<tr>
<td>437.leslie3d</td>
<td>23.3</td>
<td>404</td>
<td>23.2</td>
<td>406</td>
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<td>444.namd</td>
<td>225</td>
<td>35.7</td>
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<td>35.7</td>
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<td>447.dealII</td>
<td>156</td>
<td>73.3</td>
<td>158</td>
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<tr>
<td>450.soplex</td>
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<td>53.1</td>
<td>159</td>
<td>52.4</td>
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<tr>
<td>453.povray</td>
<td>77.0</td>
<td>69.1</td>
<td>77.6</td>
<td>68.5</td>
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<tr>
<td>454.calculix</td>
<td>117</td>
<td>70.8</td>
<td>117</td>
<td>70.7</td>
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<tr>
<td>459.GemsFDTD</td>
<td>82.8</td>
<td>128</td>
<td>85.1</td>
<td>125</td>
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<tr>
<td>465.tonto</td>
<td>242</td>
<td>40.7</td>
<td>223</td>
<td>44.0</td>
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<tr>
<td>470.lbm</td>
<td>6.17</td>
<td>2230</td>
<td>5.59</td>
<td>2460</td>
</tr>
<tr>
<td>481.wrf</td>
<td>83.2</td>
<td>134</td>
<td>83.2</td>
<td>134</td>
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<tr>
<td>482.sphinx3</td>
<td>307</td>
<td>63.5</td>
<td>310</td>
<td>62.9</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
IRQ balance service was stop using "service irqbalance stop"
Tuned-adm profile was set to Throughput-Performance

Platform Notes
BIOS Configuration:
Intel Hyperthreading set to Disabled
Thermal Configuration set to Maximum Cooling
LLC Prefetch set to Enabled
LLC Dead Line Allocation set to Disabled

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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 /cpu2006/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d3b4eb51ed28d7f98696cbe290d1)
running on DL560-Gen10 Tue Nov 21 12:41:13 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) Platinum 8170 CPU @ 2.10GHz
  4 "physical id"s (chips)
  104 "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  : 26
siblings  : 26
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
  26 27 28 29
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
  26 27 28 29
physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
  26 27 28 29
physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
  26 27 28 29
cache size  : 36608 KB

From /proc/meminfo
MemTotal:       792067508 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
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:
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Platform Notes (Continued)

Linux DL560-Gen10 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 Nov 20 15:36

SPEC is set to: /cpu2006

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda1 xfs 447G 46G 402G 11% /

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 = "/cpu2006/lib/ia32:/cpu2006/lib/intel64:/cpu2006/sh10.2"
OMP_NUM_THREADS = "104"

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

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.games: -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

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-revG.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-revG.xml
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