## SPEC® CFP2006 Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
Synergy 480 Gen9  
(2.10 GHz, Intel Xeon E5-2620 v4)

<table>
<thead>
<tr>
<th>SPECfp®2006</th>
<th>SPECfp_base2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>107</td>
<td>102</td>
</tr>
</tbody>
</table>

**CPU2006 license:** 3  
**Test date:** Oct-2016  
**Test sponsor:** HPE  
**Hardware Availability:** Dec-2016  
**Software Availability:** Sep-2016

### Software

- **Operating System:** SUSE Linux Enterprise Server 12 (x86_64) SP1,  
  Kernel 3.12.49-11-default  
- **Compiler:** C/C++: Version 17.0.0.098 of Intel C++ Studio XE for Linux,  
  Fortran: Version 17.0.0.098 of Intel Fortran Studio XE for Linux  
- **Auto Parallel:** Yes  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)

### Hardware

- **CPU Name:** Intel Xeon E5-2620 v4  
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.00 GHz  
- **CPU MHz:** 2100  
- **CPU(s) enabled:** 16 cores, 2 chips, 8 cores/chip, 2 threads/core  
- **CPU(s) orderable:** 1.2 chip  
- **Primary Cache:** 32 KB I + 32 KB D on chip per core  
- **Secondary Cache:** 256 KB I+D on chip per core

### Test Results

- **410.bwaves**  
  Result: 39.9
- **416.gamess**  
  Result: 35.8
- **433.milc**  
  Result: 72.0
- **434.zeusmp**  
  Result: 181
- **435.gromacs**  
  Result: 43.3
- **436.cactusADM**  
  Result: 642
- **437.leslie3d**  
  Result: 306
- **444.namd**  
  Result: 26.7
- **447.dealII**  
  Result: 58.4
- **450.soplex**  
  Result: 44.4
- **453.povray**  
  Result: 61.7
- **454.calculix**  
  Result: 53.2
- **459.GemsFDTD**  
  Result: 52.5
- **465.tonto**  
  Result: 51.7
- **470.lbm**  
  Result: 38.1
- **481.wrf**  
  Result: 110
- **482.sphinx3**  
  Result: 65.5

---

**Cont. on next page**

---

**Continued on next page**
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>25.3</td>
<td>538</td>
<td>25.1</td>
<td>541</td>
<td>25.2</td>
<td>530</td>
<td>25.3</td>
<td>538</td>
<td>25.1</td>
<td>541</td>
</tr>
<tr>
<td>416.gamess</td>
<td>547</td>
<td>35.8</td>
<td>547</td>
<td>35.8</td>
<td>550</td>
<td>35.6</td>
<td>491</td>
<td>39.9</td>
<td>492</td>
<td>39.8</td>
</tr>
<tr>
<td>433.milc</td>
<td>127</td>
<td>72.3</td>
<td>129</td>
<td>71.1</td>
<td>128</td>
<td>72.0</td>
<td>127</td>
<td>72.3</td>
<td>129</td>
<td>71.1</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>50.1</td>
<td>182</td>
<td>50.4</td>
<td>181</td>
<td>50.4</td>
<td>180</td>
<td>50.1</td>
<td>182</td>
<td>50.4</td>
<td>181</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>165</td>
<td>43.3</td>
<td>165</td>
<td>43.3</td>
<td>168</td>
<td>42.4</td>
<td>165</td>
<td>43.3</td>
<td>165</td>
<td>43.3</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>18.6</td>
<td>642</td>
<td>18.6</td>
<td>642</td>
<td>18.3</td>
<td>653</td>
<td>18.6</td>
<td>642</td>
<td>18.6</td>
<td>642</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>30.9</td>
<td>304</td>
<td>30.3</td>
<td>310</td>
<td>30.7</td>
<td>306</td>
<td>30.9</td>
<td>304</td>
<td>30.3</td>
<td>310</td>
</tr>
<tr>
<td>444.namd</td>
<td>307</td>
<td>26.1</td>
<td>304</td>
<td>26.4</td>
<td>308</td>
<td>26.0</td>
<td>303</td>
<td>26.4</td>
<td>301</td>
<td>26.7</td>
</tr>
<tr>
<td>447.dealII</td>
<td>196</td>
<td>58.4</td>
<td>195</td>
<td>58.6</td>
<td>196</td>
<td>58.4</td>
<td>196</td>
<td>58.4</td>
<td>195</td>
<td>58.6</td>
</tr>
<tr>
<td>450.soplex</td>
<td>188</td>
<td>44.4</td>
<td>183</td>
<td>45.6</td>
<td>188</td>
<td>44.3</td>
<td>188</td>
<td>44.4</td>
<td>183</td>
<td>45.6</td>
</tr>
<tr>
<td>453.povray</td>
<td>99.8</td>
<td>53.3</td>
<td>100</td>
<td>53.1</td>
<td>99.9</td>
<td>53.2</td>
<td>85.9</td>
<td>61.9</td>
<td>88.0</td>
<td>60.5</td>
</tr>
<tr>
<td>454.calcullx</td>
<td>158</td>
<td>52.1</td>
<td>157</td>
<td>52.5</td>
<td>157</td>
<td>52.5</td>
<td>151</td>
<td>54.8</td>
<td>151</td>
<td>54.8</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>51.9</td>
<td>204</td>
<td>52.9</td>
<td>200</td>
<td>50.4</td>
<td>211</td>
<td>43.9</td>
<td>242</td>
<td>43.9</td>
<td>242</td>
</tr>
<tr>
<td>465.tonto</td>
<td>258</td>
<td>38.2</td>
<td>258</td>
<td>38.1</td>
<td>261</td>
<td>37.7</td>
<td>190</td>
<td>51.7</td>
<td>190</td>
<td>51.7</td>
</tr>
<tr>
<td>470.lbm</td>
<td>20.6</td>
<td>666</td>
<td>21.0</td>
<td>653</td>
<td>20.9</td>
<td>659</td>
<td>20.6</td>
<td>666</td>
<td>21.0</td>
<td>653</td>
</tr>
<tr>
<td>481.wrf</td>
<td>102</td>
<td>110</td>
<td>100</td>
<td>111</td>
<td>101</td>
<td>110</td>
<td>102</td>
<td>110</td>
<td>100</td>
<td>111</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>296</td>
<td>65.8</td>
<td>298</td>
<td>65.5</td>
<td>298</td>
<td>65.5</td>
<td>296</td>
<td>65.8</td>
<td>298</td>
<td>65.5</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 with:
echo always > /sys/kernel/mm/transparent_hugepage/enabled

### Platform Notes

BIOS Configuration:
- Power Profile set to Custom
- Power Regulator to Static High Performance Mode
- Minimum Processor Idle Power Core C-State set to C6 State
- Minimum Processor Idle Power Package C-State set to No Package State
- Energy/Performance Bias set to Maximum Performance
- Collaborative Power Control set to Disabled

Continued on next page
Platform Notes (Continued)

QPI Snoop Configuration set to Home Snoop
Thermal Configuration set to Maximum Cooling
Processor Power and Utilization Monitoring set to Disabled
Memory Refresh Rate set to 1x Refresh

Sysinfo program /home/cpu2006/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8dd4eb51ed28d7f98696cbe290c1)
running on linux-8p7b Fri Oct 21 09:07:04 2016

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) CPU E5-2620 v4 @ 2.10GHz
    2 "physical id"s (chips)
    32 "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 1 2 3 4 5 6 7
    physical 1: cores 0 1 2 3 4 5 6 7
  cache size : 20480 KB

From /proc/meminfo
  MemTotal:       264547668 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB

/usr/bin/lsb_release -d
  SUSE Linux Enterprise Server 12 SP1

From /etc/*release*/etc/*version*
  SuSE-release:
    SUSE Linux Enterprise Server 12 (x86_64)
    VERSION = 12
    PATCHLEVEL = 1
    # This file is deprecated and will be removed in a future service pack or
    # release.
    # Please check /etc/os-release for details about this release.
  os-release:
    NAME="SLES"
    VERSION="12-SP1"
    VERSION_ID="12.1"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12:sp1"

uname -a:
Continued on next page
SPEC CFP2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen9
(2.10 GHz, Intel Xeon E5-2620 v4)

SPECfp2006 = 107
SPECfp_base2006 = 102

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

Test date: Oct-2016
Hardware Availability: Dec-2016
Software Availability: Sep-2016

Platform Notes (Continued)

(8d714a0) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Oct 21 09:04

SPEC is set to: /home/cpu2006

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 517G 64G 453G 13% /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 HP I37 09/14/2016
Memory:
8x UNKNOWN NOT AVAILABLE
16x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz, configured at 2133 MHz

(End of data from sysinfo program)
Regarding the sysinfo display about the memory installed, the correct amount of
memory is 256 GB and the dmidecode description should have one line reading as:
16x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz, configured at 2133 MHz

General Notes

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,1,0"
LD_LIBRARY_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/sh10.2"
OMP_NUM_THREADS = "16"

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
SPEC CFP2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen9
(2.10 GHz, Intel Xeon E5-2620 v4)

SPECfp2006 = 107
SPECfp_base2006 = 102

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

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.lesle3d: -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

Peak Compiler Invocation

C benchmarks:
icc -m64

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
icc -m64 ifort -m64
**Peak Portability Flags**

Same as Base Portability Flags

**Peak Optimization Flags**

C benchmarks:

433.milc: basepeak = yes

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

C++ benchmarks:

444.namd: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -fno-alias -auto-ilk32

447.dealII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll2 -inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll2 -inline-level=0 -qopt-prefetch -parallel

465.tonto: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -inline-calloc -qopt-malloc-options=3
-auto -unroll4

Continued on next page
SPEC CFP2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen9
(2.10 GHz, Intel Xeon E5-2620 v4)

SPECfp2006 = 107
SPECfp_base2006 = 102

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

Test date: Oct-2016
Hardware Availability: Dec-2016
Software Availability: Sep-2016

Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes
436.cactusADM: basepeak = yes
454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32
481.wrf: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.html
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.xml
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64.xml

SPEC and SPECfp are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU2006 v1.2.
Originally published on 15 November 2016.