# SPEC® CFP2006 Result

**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

ProLiant DL380 Gen9

(2.00 GHz, Intel Xeon E5-2660 v4)

<table>
<thead>
<tr>
<th>SPECfp®2006 =</th>
<th>117</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_base2006 =</td>
<td>111</td>
</tr>
</tbody>
</table>

### CPU2006 license:
3

### Test date:
Apr-2016

### Test sponsor:
HPE

### Hardware Availability:
Mar-2016

### Tested by:
HPE

### Software Availability:
Nov-2015

### Test date:
Apr-2016

### Hardware

<table>
<thead>
<tr>
<th>Software</th>
<th>Auto Parallel:</th>
<th>File System:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System:</td>
<td>Red Hat Enterprise Linux Server release 7.2, (Maipo)</td>
<td>Yes</td>
</tr>
<tr>
<td>Compiler:</td>
<td>C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux; Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux</td>
<td>xfs</td>
</tr>
<tr>
<td>CPU Name:</td>
<td>Intel Xeon E5-2660 v4</td>
<td></td>
</tr>
<tr>
<td>CPU Characteristics:</td>
<td>Intel Turbo Boost Technology up to 3.20 GHz</td>
<td></td>
</tr>
<tr>
<td>CPU MHz:</td>
<td>2000</td>
<td></td>
</tr>
<tr>
<td>FPU:</td>
<td>Integrated</td>
<td></td>
</tr>
<tr>
<td>CPU(s) enabled:</td>
<td>28 cores, 2 chips, 14 cores/chip, 2 threads/core</td>
<td></td>
</tr>
<tr>
<td>CPU(s) orderable:</td>
<td>1,2 chip</td>
<td></td>
</tr>
<tr>
<td>Primary Cache:</td>
<td>32 KB I + 32 KB D on chip per core</td>
<td></td>
</tr>
<tr>
<td>Secondary Cache:</td>
<td>256 KB I+D on chip per core</td>
<td></td>
</tr>
</tbody>
</table>

### Software

- **410.bwaves**
  - CPU: 42.6
  - Time: 33.2

- **416.gamess**
  - CPU: 71.5
  - Time: 201

- **433.milc**
  - CPU: 44.1

- **434.zeusmp**
  - CPU: 44.1

- **435.gromacs**
  - CPU: 44.1

- **436.cactusADM**
  - CPU: 358

- **437.leslie3d**
  - CPU: 248

- **444.namd**
  - CPU: 29.0

- **447.dealII**
  - CPU: 62.3

- **450.soplex**
  - CPU: 46.9

- **453.povray**
  - CPU: 65.0

- **454.calculix**
  - CPU: 57.4

- **459.GemsFDTD**
  - CPU: 50.9

- **465.tonto**
  - CPU: 53.6

- **470.lbm**
  - CPU: 39.1

- **481.wrf**
  - CPU: 107

- **482.sphinx3**
  - CPU: 66.2

---

Continued on next page
## SPEC CFP2006 Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL380 Gen9  
(2.00 GHz, Intel Xeon E5-2660 v4)

<table>
<thead>
<tr>
<th>Benchmark</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>22.1</td>
<td>615</td>
<td>22.1</td>
<td>614</td>
<td>22.0</td>
<td>617</td>
</tr>
<tr>
<td>416.gamess</td>
<td>588</td>
<td>33.3</td>
<td>589</td>
<td>33.2</td>
<td>591</td>
<td>33.1</td>
</tr>
<tr>
<td>433.milc</td>
<td>128</td>
<td>71.6</td>
<td>128</td>
<td>71.5</td>
<td>129</td>
<td>71.1</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>45.1</td>
<td>202</td>
<td>45.3</td>
<td>201</td>
<td>45.3</td>
<td>201</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>162</td>
<td>44.2</td>
<td>162</td>
<td>44.1</td>
<td>165</td>
<td>43.3</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>13.6</td>
<td>878</td>
<td>13.6</td>
<td>876</td>
<td>13.7</td>
<td>870</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>26.2</td>
<td>358</td>
<td>27.1</td>
<td>347</td>
<td>25.4</td>
<td>369</td>
</tr>
<tr>
<td>444.namd</td>
<td>283</td>
<td>284</td>
<td>283</td>
<td>284</td>
<td>283</td>
<td>284</td>
</tr>
<tr>
<td>447.dealII</td>
<td>184</td>
<td>62.2</td>
<td>183</td>
<td>62.3</td>
<td>183</td>
<td>62.4</td>
</tr>
<tr>
<td>450.soplex</td>
<td>178</td>
<td>46.9</td>
<td>177</td>
<td>47.0</td>
<td>178</td>
<td>46.9</td>
</tr>
<tr>
<td>453.povray</td>
<td>92.5</td>
<td>57.5</td>
<td>92.7</td>
<td>57.4</td>
<td>93.1</td>
<td>57.1</td>
</tr>
<tr>
<td>454.calculix</td>
<td>162</td>
<td>50.9</td>
<td>163</td>
<td>50.7</td>
<td>162</td>
<td>50.9</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>42.4</td>
<td>250</td>
<td>42.8</td>
<td>248</td>
<td>44.3</td>
<td>239</td>
</tr>
<tr>
<td>465.tonto</td>
<td>252</td>
<td>39.0</td>
<td>251</td>
<td>39.1</td>
<td>251</td>
<td>39.2</td>
</tr>
<tr>
<td>470.lbm</td>
<td>16.2</td>
<td>846</td>
<td>16.1</td>
<td>855</td>
<td>16.1</td>
<td>851</td>
</tr>
<tr>
<td>481.wrf</td>
<td>105</td>
<td>106</td>
<td>98.4</td>
<td>114</td>
<td>104</td>
<td>107</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>293</td>
<td>66.5</td>
<td>294</td>
<td>66.2</td>
<td>295</td>
<td>66.1</td>
</tr>
</tbody>
</table>

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:  
HP Power Profile set to Custom  
HP Power Regulator to HP Static High Performance Mode  
Minimum Processor Idle Power Core C-State set to CLE State  
Minimum Processor Idle Power Package C-State set to No Package State  
QPI Snoop Configuration set to Home Snoop  
Collaborative Power Control set to Disabled  
Thermal Configuration set to Maximum Cooling

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen9
(2.00 GHz, Intel Xeon E5-2660 v4)

SPECfp2006 = 117
SPECfp_base2006 = 111

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

Test date: Apr-2016
Hardware Availability: Mar-2016
Software Availability: Nov-2015

Platform Notes (Continued)

Processor Power and Utilization Monitoring set to Disabled
Memory Refresh Rate set to 1x Refresh

Sysinfo program /home/cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on DL380Gen9allbin Wed Apr 27 07:06:01 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 E5-2660 v4@ 2.00GHz
  2 "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 : 28
  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
  cache size : 35840 KB

From /proc/meminfo
MemTotal:       528063720 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
os-release:
  NAME="Red Hat Enterprise Linux Server"
  VERSION="7.2 (Maipo)"
  ID="rhel"
  ID_LIKE="fedora"
  VERSION_ID="7.2"
  PRETTY_NAME="Red Hat Enterprise Linux Server 7.2 (Maipo)"
  ANSI_COLOR="0;31"
  CPE_NAME=cpe:/o:redhat:enterprise_linux:7.2:GA:server
  redhat-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
  system-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)

uname -a:
Linux DL380Gen9allbin 3.10.0-327.el7.x86_64 #1 SMP Thu Oct 29 17:29:29 EDT
2015 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Apr 27 06:29

SPEC is set to: /home/cpu2006
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda5  xfs  318G 153G 165G  49% /home

Continued on next page
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen9
(2.00 GHz, Intel Xeon E5-2660 v4)

SPECfp2006 = 117
SPECfp_base2006 = 111

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

Platform Notes (Continued)

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 P89 03/23/2016
Memory:
8x UNKNOWN NOT AVAILABLE
16x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2400 MHz

(End of data from sysinfo program)

Regarding the sysinfo display about the memory installed, the correct amount of memory is 512 GB and the dmidecode description should have one line reading as: 16x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2400 MHz

General Notes

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,1,0"
OMP_NUM_THREADS = "28"
LD_LIBRARY_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/sh"

Binaries compiled on a system with 1x Intel Xeon E5-2660 v4 CPU + 128GB memory using RedHat EL 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

Base Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64

Continued on next page
SPEC CFP2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen9
(2.00 GHz, Intel Xeon E5-2660 v4)

SPECfp2006 = 117
SPECfp_base2006 = 111

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

Base Portability Flags (Continued)

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
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 -static -parallel -opt-prefetch
-ansi-alias -fp-model fast=2
-qopt-prefetch-issue-excl-hint

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -static -opt-prefetch -ansi-alias
-fp-model fast=2
-qopt-prefetch-issue-excl-hint

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch
-fp-model fast=2
-qopt-prefetch-issue-excl-hint

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch
-ansi-alias -fp-model fast=2
-qopt-prefetch-issue-excl-hint

Peak Compiler Invocation

C benchmarks:
icc -m64

C++ benchmarks:
icpc -m64

Continued on next page
Hewlett Packard Enterprise  
(Test Sponsor: HPE) 
ProLiant DL380 Gen9  
(2.00 GHz, Intel Xeon E5-2660 v4) 

SPECfp2006 = 117 
SPECfp_base2006 = 111

CPU2006 license: 3  
Test date: Apr-2016  
Test sponsor: HPE  
Hardware Availability: Mar-2016  
Tested by: HPE  
Software Availability: Nov-2015

Peak Compiler Invocation (Continued)

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: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)  
             -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)  
             -par-num-threads=1(pass 1) -prof-use(pass 2) -fno-alias  
             -auto-ilp32

  447.dealII: basepeak = yes
  450.soplex: basepeak = yes
  453.povray: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)  
             -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)  
             -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4  
             -ansi-alias

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

Continued on next page
SPEC CFP2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen9
(2.00 GHz, Intel Xeon E5-2660 v4)

SPECfp2006 = 117
SPECfp_base2006 = 111

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

Test date: Apr-2016
Hardware Availability: Mar-2016
Software Availability: Nov-2015

Peak Optimization Flags (Continued)

434.zeusmp: basepeak = yes
437.leslie3d: basepeak = yes

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

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

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 -ansi-alias
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/HP-Compiler-Flags-Intel-V1.2-BDW-revE.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/HP-Compiler-Flags-Intel-V1.2-BDW-revE.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.
Report generated on Tue May 17 16:51:07 2016 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 17 May 2016.