



SPEC[®] CFP2006 Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

Synergy 480 Gen9
(3.20 GHz, Intel Xeon E5-2667 v4)

SPECfp[®]2006 = 130

SPECfp_base2006 = 126

CPU2006 license: 3

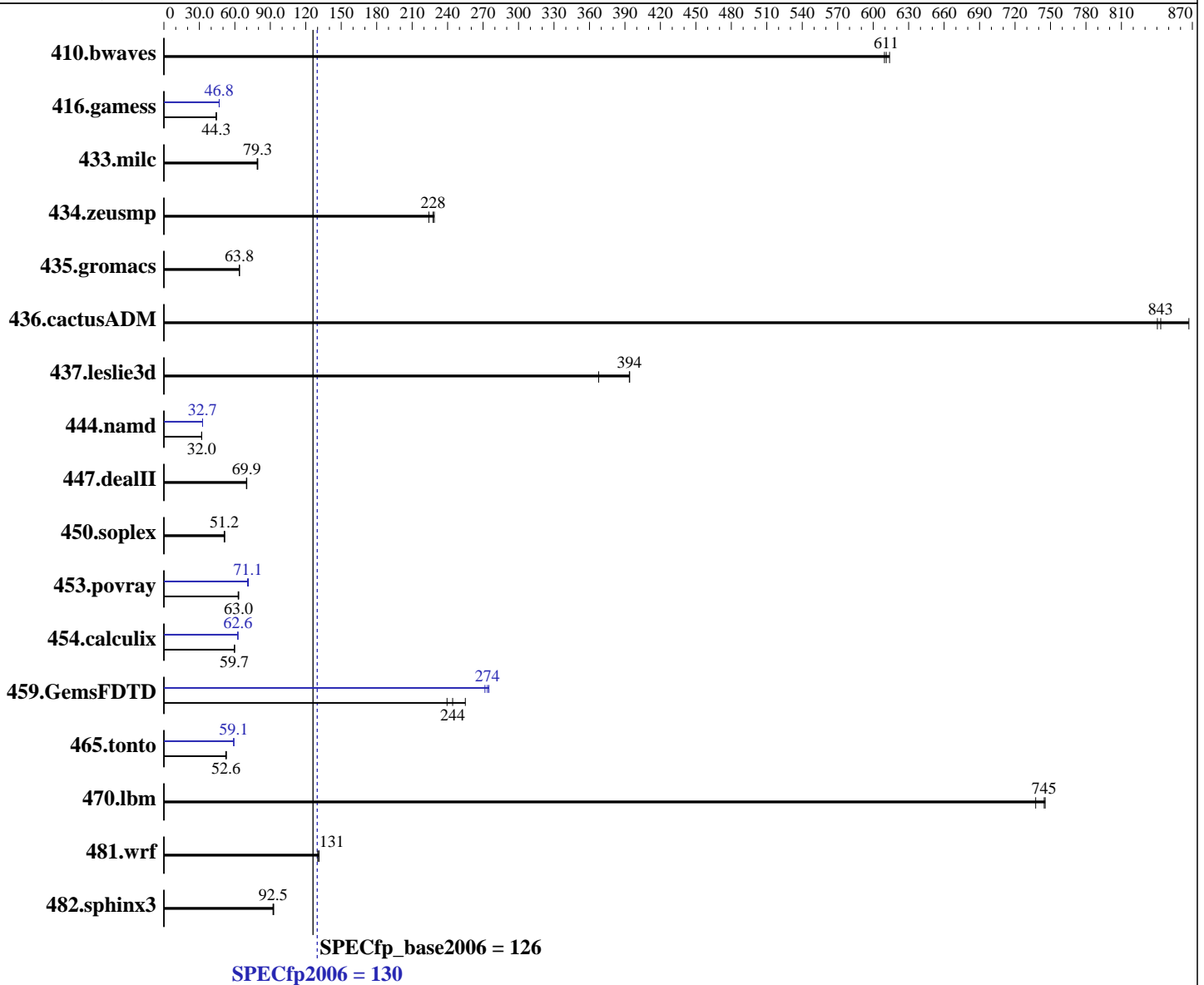
Test sponsor: HPE

Tested by: HPE

Test date: Jul-2016

Hardware Availability: Dec-2016

Software Availability: Dec-2015



| Hardware | | Software | |
|------------------------|---|------------------------|---|
| CPU Name: | Intel Xeon E5-2667 v4 | Operating System: | SUSE Linux Enterprise Server 12 (x86_64) SP1, Kernel 3.12.49-11-default |
| CPU Characteristics: | Intel Turbo Boost Technology up to 3.60 GHz | Compiler: | 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 |
| CPU MHz: | 3200 | Auto Parallel: | Yes |
| FPU: | Integrated | File System: | xfs |
| CPU(s) enabled: | 16 cores, 2 chips, 8 cores/chip, 2 threads/core | System State: | Run level 3 (multi-user) |
| 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 | | |
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L3 Cache: 25 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)
Disk Subsystem: 1 x 600 GB 10 K SAS, RAID 0
Other Hardware: None

Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other Software: None

Results Table

| Benchmark | Base | | | | | | Peak | | | | | |
|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 22.3 | 610 | <u>22.2</u> | <u>611</u> | 22.1 | 614 | 22.3 | 610 | <u>22.2</u> | <u>611</u> | 22.1 | 614 |
| 416.gamess | <u>442</u> | <u>44.3</u> | 443 | 44.2 | 442 | 44.3 | 419 | 46.8 | 418 | 46.8 | <u>419</u> | <u>46.8</u> |
| 433.milc | <u>116</u> | <u>79.3</u> | 116 | 79.4 | 116 | 78.9 | <u>116</u> | <u>79.3</u> | 116 | 79.4 | 116 | 78.9 |
| 434.zeusmp | 40.6 | 224 | 39.8 | 229 | <u>40.0</u> | <u>228</u> | 40.6 | 224 | 39.8 | 229 | <u>40.0</u> | <u>228</u> |
| 435.gromacs | <u>112</u> | <u>63.8</u> | 112 | 63.8 | 112 | 63.9 | <u>112</u> | <u>63.8</u> | 112 | 63.8 | 112 | 63.9 |
| 436.cactusADM | 14.2 | 840 | 13.8 | 867 | <u>14.2</u> | <u>843</u> | 14.2 | 840 | 13.8 | 867 | <u>14.2</u> | <u>843</u> |
| 437.leslie3d | <u>23.9</u> | <u>394</u> | 23.9 | 394 | 25.6 | 368 | <u>23.9</u> | <u>394</u> | 23.9 | 394 | 25.6 | 368 |
| 444.namd | 251 | 32.0 | <u>251</u> | <u>32.0</u> | 251 | 32.0 | 245 | 32.7 | 245 | 32.7 | <u>245</u> | <u>32.7</u> |
| 447.dealII | <u>164</u> | <u>69.9</u> | 164 | 69.9 | 163 | 70.1 | <u>164</u> | <u>69.9</u> | 164 | 69.9 | 163 | 70.1 |
| 450.soplex | 162 | 51.5 | 164 | 51.0 | <u>163</u> | <u>51.2</u> | 162 | 51.5 | 164 | 51.0 | <u>163</u> | <u>51.2</u> |
| 453.povray | 84.0 | 63.3 | <u>84.4</u> | <u>63.0</u> | 84.7 | 62.8 | 74.4 | 71.5 | <u>74.8</u> | <u>71.1</u> | 75.2 | 70.8 |
| 454.calculix | 138 | 59.7 | <u>138</u> | <u>59.7</u> | 138 | 59.7 | 132 | 62.6 | 132 | 62.5 | <u>132</u> | <u>62.6</u> |
| 459.GemsFDTD | 41.6 | 255 | 44.3 | 240 | <u>43.4</u> | <u>244</u> | 39.1 | 272 | 38.6 | 275 | <u>38.8</u> | <u>274</u> |
| 465.tonto | <u>187</u> | <u>52.6</u> | 186 | 52.9 | 188 | 52.3 | <u>167</u> | <u>59.1</u> | 167 | 59.0 | 166 | 59.1 |
| 470.lbm | 18.6 | 737 | 18.4 | 745 | <u>18.5</u> | <u>745</u> | 18.6 | 737 | 18.4 | 745 | <u>18.5</u> | <u>745</u> |
| 481.wrf | 85.9 | 130 | 85.2 | 131 | <u>85.3</u> | <u>131</u> | 85.9 | 130 | 85.2 | 131 | <u>85.3</u> | <u>131</u> |
| 482.sphinx3 | 210 | 92.9 | <u>211</u> | <u>92.5</u> | 211 | 92.3 | 210 | 92.9 | <u>211</u> | <u>92.5</u> | 211 | 92.3 |

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
QPI Snoop Configuration set to Home Snoop

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Platform Notes (Continued)

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.rev6914
\$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1
running on linux-fkpc Fri Jul 29 16:00:07 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 E5-2667 v4 @ 3.20GHz
 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 2 3 4 8 10 11 12
  physical 1:   cores 0 2 3 4 8 10 11 12
  cache size    : 25600 KB
```

```
From /proc/meminfo
MemTotal:      264547684 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:
Linux linux-fkpc 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
```

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Platform Notes (Continued)

(8d714a0) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jul 29 11:17

SPEC is set to: /home/cpu2006

| Filesystem | Type | Size | Used | Avail | Use% | Mounted on |
|------------|------|------|------|-------|------|------------|
| /dev/sda4 | xfs | 517G | 165G | 353G | 32% | /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 07/21/2016

Memory:

8x UNKNOWN NOT AVAILABLE

16x UNKNOWN NOT AVAILABLE 16 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 256 GB and the dmidecode description should have one line reading as: 16x UNKNOWN NOT AVAILABLE 16 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 = "44"

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



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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.lelie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.deallI: -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 -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
```

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Peak Compiler Invocation (Continued)

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: -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.dealIII: 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-

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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-HSW-revF.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-HSW-revF.xml>

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