### SPEC® CFP2006 Result

**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

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

SPECfp®2006 = 130

SPECfp_base2006 = 126

<table>
<thead>
<tr>
<th>Test date:</th>
<th>Jul-2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Dec-2016</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2015</td>
</tr>
</tbody>
</table>

**CPU2006 license:** 3

**Test sponsor:** HPE

**Tested by:** HPE

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<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon E5-2667 v4</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Characteristics:</td>
<td>Intel Turbo Boost Technology up to 3.60 GHz</td>
</tr>
<tr>
<td>CPU MHz:</td>
<td>3200</td>
</tr>
<tr>
<td>FPU:</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled:</td>
<td>16 cores, 2 chips, 8 cores/chip, 2 threads/core</td>
</tr>
<tr>
<td>CPU(s) orderable:</td>
<td>1,2 chip</td>
</tr>
<tr>
<td>Primary Cache:</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Secondary Cache:</td>
<td>256 KB I+D on chip per core</td>
</tr>
</tbody>
</table>

| 410.bwaves | 46.8 |
| 416.gamess | 44.3 |
| 433.milc | 79.3 |
| 434.zeusmp | 228 |
| 435.gromacs | 63.8 |
| 436.cactusADM | |
| 437.leslie3d | 394 |
| 444.namd | 32.7 |
| 447.dealII | 69.9 |
| 450.soplex | 51.2 |
| 453.povray | 71.1 |
| 454.calculix | 63.0 |
| 459.GemsFDTD | 59.7 |
| 465.tonto | 244 |
| 470.lbm | 52.6 |
| 481.wrf | 131 |
| 482.sphinx3 | 92.5 |

**Software**

<table>
<thead>
<tr>
<th>Operating System:</th>
<th>SUSE Linux Enterprise Server 12 (x86_64) SP1, Kernel 3.12.49-11-default</th>
</tr>
</thead>
<tbody>
<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>
</tr>
<tr>
<td>Auto Parallel:</td>
<td>Yes</td>
</tr>
<tr>
<td>File System:</td>
<td>xfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
</tbody>
</table>

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

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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.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 -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.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-

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**Peak Optimization Flags (Continued)**

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: -xCORE-AVX2(pass 2) -prof-gen:threadsafepass 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:threadsafepass 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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For other inquiries, please contact webmaster@spec.org.

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