SPEC® CFP2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen10
(2.10 GHz, Intel Xeon Silver 4116)

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

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

SPECfp®_rate2006 = Not Run
SPECfp_rate_base2006 = 903

HPE
CPU Name: Intel Xeon Silver 4116
CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz
CPU MHz: 2100
FPU: Integrated
CPU(s) enabled: 24 cores, 2 chips, 12 cores/chip, 2 threads/core
CPU(s) orderable: 1, 2 chip(s)
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 1 MB I+D on chip per core

Continued on next page

Operating System: SUSE Linux Enterprise Server 12 (x86_64) SP2
Kernel 4.4.21-69-default
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: No
File System: xfs
System State: Run level 3 (multi-user)

Continued on next page
SPEC CFP2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen10
(2.10 GHz, Intel Xeon Silver 4116)

SPECfp_rate2006 = Not Run
SPECfp_rate_base2006 = 903

CPU2006 license: 3
Test sponsor: HPE
Tested by: HPE
Test date: Nov-2017
Hardware Availability: Oct-2017
Test sponsor: HPE
Software Availability: Apr-2017

L3 Cache: 16.5 MB I+D on chip per chip
Other Cache: None
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)
Disk Subsystem: 1 x 480 GB SATA SSD, RAID 0
Other Hardware: None
Base Pointers: 32/64-bit
Peak Pointers: Not Applicable
Other Software: None

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>48</td>
<td>817</td>
<td>799</td>
<td>815</td>
<td>800</td>
<td>816</td>
<td>799</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>416.gamess</td>
<td>48</td>
<td>1128</td>
<td>833</td>
<td><strong>1126</strong></td>
<td><strong>834</strong></td>
<td>1126</td>
<td>835</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>433.milc</td>
<td>48</td>
<td>546</td>
<td>807</td>
<td><strong>546</strong></td>
<td><strong>807</strong></td>
<td>546</td>
<td>807</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>48</td>
<td>380</td>
<td>1150</td>
<td><strong>380</strong></td>
<td><strong>1150</strong></td>
<td>379</td>
<td>1150</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>435.gromacs</td>
<td>48</td>
<td><strong>338</strong></td>
<td><strong>1010</strong></td>
<td>337</td>
<td>1020</td>
<td>338</td>
<td>1010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>48</td>
<td>468</td>
<td>1230</td>
<td>468</td>
<td>1220</td>
<td><strong>468</strong></td>
<td><strong>1230</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>48</td>
<td>749</td>
<td>603</td>
<td><strong>750</strong></td>
<td><strong>602</strong></td>
<td>750</td>
<td>602</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>444.namd</td>
<td>48</td>
<td><strong>560</strong></td>
<td><strong>688</strong></td>
<td>562</td>
<td>686</td>
<td>560</td>
<td>688</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>447.dealII</td>
<td>48</td>
<td>401</td>
<td>1370</td>
<td>402</td>
<td>1370</td>
<td><strong>401</strong></td>
<td><strong>1370</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>450.soplex</td>
<td>48</td>
<td>684</td>
<td>585</td>
<td><strong>680</strong></td>
<td><strong>588</strong></td>
<td>680</td>
<td>589</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>453.povray</td>
<td>48</td>
<td>220</td>
<td>1160</td>
<td>222</td>
<td>1150</td>
<td><strong>221</strong></td>
<td><strong>1150</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>454.calculix</td>
<td>48</td>
<td>308</td>
<td>1290</td>
<td>310</td>
<td>1280</td>
<td><strong>308</strong></td>
<td><strong>1280</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>459.GemsFD</td>
<td>48</td>
<td>905</td>
<td>562</td>
<td><strong>905</strong></td>
<td><strong>563</strong></td>
<td>905</td>
<td>563</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>465.tonto</td>
<td>48</td>
<td>521</td>
<td>907</td>
<td>527</td>
<td>896</td>
<td><strong>526</strong></td>
<td><strong>898</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>470.llvm</td>
<td>48</td>
<td>595</td>
<td>1110</td>
<td><strong>596</strong></td>
<td><strong>1110</strong></td>
<td>596</td>
<td>1110</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>481.wrf</td>
<td>48</td>
<td><strong>544</strong></td>
<td><strong>985</strong></td>
<td>546</td>
<td>983</td>
<td>541</td>
<td>990</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>48</td>
<td>1124</td>
<td>832</td>
<td>1116</td>
<td>838</td>
<td><strong>1117</strong></td>
<td><strong>838</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes
The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

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
runspec command invoked through numactl i.e.:
numactl --interleave=all runspec <etc>
irqbalance disabled with "service irqbalance stop"
Continued on next page
Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen10
(2.10 GHz, Intel Xeon Silver 4116)

SPEC CFP2006 Result

SPECfp_rate2006 = Not Run
SPECfp_rate_base2006 = 903

CPU2006 license: 3
Test date: Nov-2017
Test sponsor: HPE
Hardware Availability: Oct-2017
Tested by: HPE
Software Availability: Apr-2017

Operating System Notes (Continued)

- Tuned profile set with "tuned-adm profile throughput-performance"
- VM Dirty ratio was set to 40 using "echo 40 > /proc/sys/vm/dirty_ratio"
- Numa balancing was disabled using "echo 0 > /proc/sys/kernel/numa_balancing"

Platform Notes

- BIOS Configuration:
  - Thermal Configuration set to Maximum Cooling
  - LLC Prefetch set to Enabled
  - LLC Dead Line Allocation set to Disabled
  - Memory Patrol Scrubbing set to Disabled
  - Workload Profile set to General Throughput Compute
  - Minimum Processor Idle Power Core C-State set to C1E
  - Sysinfo program /home/cpu2006/config/sysinfo.rev6993
  - Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
  - Running on sy480_hjp_suse_machine1 Sat Nov 18 01:36:56 2017

- From /proc/cpuinfo
  - Model name: Intel(R) Xeon(R) Silver 4116 CPU @ 2.10GHz
  - 2 "physical id"s (chips)
  - 48 "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: 12
    - Siblings: 24
    - Physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
    - Physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13
  - Cache size: 16896 KB

- From /proc/meminfo
  - MemTotal: 395926632 KB
  - HugePages_Total: 0
  - Hugepagesize: 2048 KB

- From /etc/*release* /etc/*version*
  - SuSE-release:
    - SUSE Linux Enterprise Server 12 (x86_64)
    - VERSION = 12
    - PATCHLEVEL = 2
    - # 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-SP2"
    - VERSION_ID="12.2"

Continued on next page
Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen10
(2.10 GHz, Intel Xeon Silver 4116)

SPECfp_rate2006 = Not Run
SPECfp_rate_base2006 = 903

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

Platform Notes (Continued)

PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
 Linux sy480_hjp_suse_machine1 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20
 UTC 2016 (9464f67) x86_64 x86_64 x86_64 GNU/Linux
	num-level 3 Nov 18 01:34

SPEC is set to: /home/cpu2006
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 405G 68G 338G 17% /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 HPE I42 09/27/2017
Memory:
  24x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666 MHz, configured at 2400 MHz

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2006/lib/ia32:/home/cpu2006/lib/intel64:/home/cpu2006/sh10.2"

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 Gen10
(2.10 GHz, Intel Xeon Silver 4116)

SPECfp_rate2006 = Not Run
SPECfp_rate_base2006 = 903

CPU2006 license: 3
Test date: Nov-2017
Test sponsor: HPE
Hardware Availability: Oct-2017
Tested by: HPE
Software Availability: Apr-2017

Base Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.games: -DSPEC_CPU_LP64
433.ml: -DSPEC_CPU_LP64
434.zesmp: -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 -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3

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
## SPEC CFP2006 Result

<table>
<thead>
<tr>
<th>HP StorageWorks Storage Performance Test Suite</th>
<th>SPECfp_rate2006 = Not Run</th>
<th>SPECfp_rate_base2006 = 903</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hewlett Packard Enterprise (Test Sponsor: HPE)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Synergy 480 Gen10 (2.10 GHz, Intel Xeon Silver 4116)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CPU2006 license:</strong> 3</td>
<td><strong>Test date:</strong> Nov-2017</td>
<td></td>
</tr>
<tr>
<td><strong>Test sponsor:</strong> HPE</td>
<td><strong>Hardware Availability:</strong> Oct-2017</td>
<td></td>
</tr>
<tr>
<td><strong>Tested by:</strong> HPE</td>
<td><strong>Software Availability:</strong> Apr-2017</td>
<td></td>
</tr>
</tbody>
</table>

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.