SPEC® CFP2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10
(1.80 GHz, Intel Xeon Silver 4108)

CPU2006 license: 3
Tested by: HPE

<table>
<thead>
<tr>
<th>SPECfp®_rate2006</th>
<th>Not Run</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_rate_base2006</td>
<td>629</td>
</tr>
</tbody>
</table>

**Software**

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: Btrfs
System State: Run level 5 (multi-user, w/GUI)

**Hardware**

CPU Name: Intel Xeon Silver 4108
CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz
CPU MHz: 1800
FPU: Integrated
CPU(s) enabled: 16 cores, 2 chips, 8 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

<table>
<thead>
<tr>
<th>Program</th>
<th>Copies</th>
<th>SPECfp_rate2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>32</td>
<td>489</td>
</tr>
<tr>
<td>416.gamess</td>
<td>32</td>
<td>704</td>
</tr>
<tr>
<td>433.milc</td>
<td>32</td>
<td>800</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>32</td>
<td>807</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>32</td>
<td>849</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>32</td>
<td>492</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>32</td>
<td>588</td>
</tr>
<tr>
<td>444.namd</td>
<td>32</td>
<td>704</td>
</tr>
<tr>
<td>447.dealII</td>
<td>32</td>
<td>800</td>
</tr>
<tr>
<td>450.soplex</td>
<td>32</td>
<td>845</td>
</tr>
<tr>
<td>453.povray</td>
<td>32</td>
<td>704</td>
</tr>
<tr>
<td>454.calculix</td>
<td>32</td>
<td>849</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>32</td>
<td>562</td>
</tr>
<tr>
<td>465.tonto</td>
<td>32</td>
<td>877</td>
</tr>
<tr>
<td>470.lbm</td>
<td>32</td>
<td>541</td>
</tr>
<tr>
<td>481.wrf</td>
<td>32</td>
<td>880</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>32</td>
<td>790</td>
</tr>
</tbody>
</table>

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

Continued on next page
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10
(1.80 GHz, Intel Xeon Silver 4108)

SPEC CFP2006 Result

SPECfp_rate2006 = Not Run
SPECfp_rate_base2006 = 629

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

L3 Cache: 11 MB I+D on chip per chip
Other Cache: None
Memory: 192 GB (24 x 8 GB 2Rx8 PC4-2666V-R, running at 2400)
Disk Subsystem: 1 x 960 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>Base Pointers</th>
<th>Peak Pointers</th>
<th>Other Software</th>
<th>Software Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>32</td>
<td>645</td>
<td>674</td>
<td>645</td>
<td>675</td>
<td>645</td>
<td>675</td>
</tr>
<tr>
<td>416.gamess</td>
<td>32</td>
<td>1278</td>
<td>490</td>
<td>1281</td>
<td>489</td>
<td>1280</td>
<td>489</td>
</tr>
<tr>
<td>433.milc</td>
<td>32</td>
<td>417</td>
<td>704</td>
<td>417</td>
<td>704</td>
<td>418</td>
<td>703</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>32</td>
<td>364</td>
<td>800</td>
<td>363</td>
<td>802</td>
<td>366</td>
<td>796</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>32</td>
<td>387</td>
<td>590</td>
<td>394</td>
<td>580</td>
<td>389</td>
<td>588</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>32</td>
<td>474</td>
<td>807</td>
<td>474</td>
<td>807</td>
<td>472</td>
<td>811</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>32</td>
<td>611</td>
<td>492</td>
<td>611</td>
<td>493</td>
<td>612</td>
<td>492</td>
</tr>
<tr>
<td>444.namd</td>
<td>32</td>
<td>640</td>
<td>401</td>
<td>639</td>
<td>402</td>
<td>639</td>
<td>401</td>
</tr>
<tr>
<td>447.dealII</td>
<td>32</td>
<td>431</td>
<td>849</td>
<td>432</td>
<td>848</td>
<td>431</td>
<td>849</td>
</tr>
<tr>
<td>450.soplex</td>
<td>32</td>
<td>590</td>
<td>452</td>
<td>588</td>
<td>454</td>
<td>587</td>
<td>454</td>
</tr>
<tr>
<td>453.povray</td>
<td>32</td>
<td>241</td>
<td>707</td>
<td>238</td>
<td>716</td>
<td>237</td>
<td>718</td>
</tr>
<tr>
<td>454.calculix</td>
<td>32</td>
<td>347</td>
<td>761</td>
<td>349</td>
<td>757</td>
<td>348</td>
<td>758</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>32</td>
<td>749</td>
<td>453</td>
<td>748</td>
<td>454</td>
<td>748</td>
<td>454</td>
</tr>
<tr>
<td>465.tonto</td>
<td>32</td>
<td>556</td>
<td>567</td>
<td>561</td>
<td>562</td>
<td>564</td>
<td>559</td>
</tr>
<tr>
<td>470.lbm</td>
<td>32</td>
<td>501</td>
<td>877</td>
<td>502</td>
<td>876</td>
<td>501</td>
<td>877</td>
</tr>
<tr>
<td>481.wrf</td>
<td>32</td>
<td>423</td>
<td>845</td>
<td>422</td>
<td>848</td>
<td>426</td>
<td>840</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>32</td>
<td>1152</td>
<td>541</td>
<td>1151</td>
<td>542</td>
<td>1153</td>
<td>541</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
SPEC CFP2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10
(1.80 GHz, Intel Xeon Silver 4108)

SPECfp_rate2006 = Not Run
SPECfp_rate_base2006 = 629

CPU2006 license: 3
Test sponsor: HPE
Tested by: HPE
Test date: Oct-2017
Hardware Availability: Oct-2017
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
Memory Patrol Scrubbing set to Disabled
LLC Prefetcher set to Enabled
LLC Dead Line Allocation set to Disabled
Workload Profile set to General Throughput Compute
Minimum Processor Idle Power Core C-State set to C1E
Workload Profile set to Custom
Sub-NUMA Clustering set to Disabled

Sysinfo program /cpu2006/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)

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) Silver 4108 CPU @ 1.80GHz
  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 : 11264 KB

From /proc/meminfo
  MemTotal: 197556236 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
  SUSE Linux Enterprise Server 12 SP2

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
Continued on next page

Standard Performance Evaluation Corporation
info@spec.org
http://www.spec.org/
SPEC CFP2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10
(1.80 GHz, Intel Xeon Silver 4108)

SPECfp_rate2006 = Not Run
SPECfp_rate_base2006 = 629

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

Platform Notes (Continued)

release.
# Please check /etc/os-release for details about this release.
os-release:
  NAME="SLES"
  VERSION="12-SP2"
  VERSION_ID="12.2"
  PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
  ID="sles"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
(9464f67) x86_64 x86_64 x86_64 GNU/Linux
run-level 5 Oct 25 13:46

SPEC is set to: /cpu2006

Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb3 btrfs 489G 50G 439G 11% /

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 U30 09/29/2017
Memory:
  24x UNKNOWN NOT AVAILABLE 8 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 = "/cpu2006/lib/ia32:/cpu2006/lib/intel64:/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

Continued on next page
SPEC CFP2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10
(1.80 GHz, Intel Xeon Silver 4108)

SPECfp_rate2006 = Not Run
SPECfp_rate_base2006 = 629

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

Base Compiler Invocation (Continued)

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
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 -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
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10
(1.80 GHz, Intel Xeon Silver 4108)

SPECfp_rate2006 = Not Run
SPECfp_rate_base2006 = 629

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

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

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-revD.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-revD.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.