Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen9
(1.70 GHz, Intel Xeon E5-2603 v4)

SPECfp®2006 = 68.9
SPECfp_base2006 = 67.4

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

Test date: Oct-2016
Hardware Availability: Dec-2016
Software Availability: Sep-2016

SPECfp2006 = 68.9
SPECfp_base2006 = 67.4

0 20.0 40.0 60.0 80.0 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480 500 520 540 560 580 600 620 640 660 680 700

0 20.0 40.0 60.0 80.0 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480 500 520 540 560 580 600 620 640 660 680 700

Hardware
CPU Name: Intel Xeon E5-2603 v4
CPU Characteristics:
CPU MHz: 1700
FPU: Integrated
CPU(s) enabled: 12 cores, 2 chips, 6 cores/chip
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

Software
Operating System: SUSE Linux Enterprise Server 12 (x86_64) SP1
Kernel 3.12.49-11-default
Compiler: C/C++: Version 17.0.0.098 of Intel C++ Studio XE for Linux;
Fortran: Version 17.0.0.098 of Intel Fortran Studio XE for Linux
Auto Parallel: Yes
File System: xfs
System State: Run level 3 (multi-user)

Continued on next page
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L3 Cache: 15 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R, running at 1866 MHz)
Disk Subsystem: 1 x 600 GB 10 K SAS, RAID 0
Other Hardware: None
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Software Availability: Sep-2016

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>384</td>
<td>50.8</td>
</tr>
</tbody>
</table>

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

Continued on next page
Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen9
(1.70 GHz, Intel Xeon E5-2603 v4)

SPECfp2006 = 68.9
SPECfp_base2006 = 67.4

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

Test date: Oct-2016
Hardware Availability: Dec-2016
Software Availability: Sep-2016

Platform Notes (Continued)

QPI Snoop Configuration set to Home Snoop
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.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) CPU E5-2603 v4 @ 1.70GHz
  2 "physical id"s (chips)
  12 "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 : 6
siblings : 6
  physical 0: cores 0 1 2 3 4 5
  physical 1: cores 0 1 2 3 4 5
  cache size : 15360 KB

From /proc/meminfo
MemTotal: 264549752 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: Continued on next page
## SPEC CFP2006 Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
Synergy 480 Gen9  
(1.70 GHz, Intel Xeon E5-2603 v4)  

| SPECfp2006 | 68.9 |  
| SPECfp_base2006 | 67.4 |

**CPU2006 license:** 3  
**Test sponsor:** HPE  
**Tested by:** HPE  
**Test date:** Oct-2016  
**Hardware Availability:** Dec-2016  
**Software Availability:** Sep-2016

### Platform Notes (Continued)

(8d714a0) x86_64 x86_64 x86_64 GNU/Linux  
run-level 3 Oct 11 13:43  
SPEC is set to: /home/cpu2006  
Filesystem  Type  Size  Used Avail Use% Mounted on  
/dev/sda4  xfs  517G  30G  488G  6% /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 09/14/2016  
Memory:  
8x UNKNOWN NOT AVAILABLE  
16x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz, configured at 1866 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, configured at 1866 MHz

### General Notes

Environment variables set by runspec before the start of the run:  
KMP_AFFINITY = "granularity=fine,compact,1,0"  
OMP_NUM_THREADS = "12"  
LD_LIBRARY_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/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 Gen9  
(1.70 GHz, Intel Xeon E5-2603 v4)  

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

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<td>Dec-2016</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Sep-2016</td>
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</table>

#### Base Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
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<tbody>
<tr>
<td>410.bwaves</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>416.games</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>433.milc</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>-DSPEC_CPU_LP64 -nofor_main</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>-DSPEC_CPU_LP64 -nofor_main</td>
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<td>453.povray</td>
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<td>459.GemsFDTD</td>
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<tr>
<td>465.tonto</td>
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<tr>
<td>481.wrf</td>
<td>-DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX</td>
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<tr>
<td>482.sphinx3</td>
<td>-DSPEC_CPU_LP64</td>
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#### Base Optimization Flags

**C benchmarks:**  
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch

**C++ benchmarks:**  
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch

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

**Benchmarks using both Fortran and C:**  
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch

#### Peak Compiler Invocation

**C benchmarks:**  
icc -m64

**C++ benchmarks:**  
icpc -m64

**Fortran benchmarks:**  
ifort -m64

**Benchmarks using both Fortran and C:**  
icc -m64 ifort -m64
Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen9
(1.70 GHz, Intel Xeon E5-2603 v4)

SPECfp2006 = 68.9
SPECfp_base2006 = 67.4

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

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

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

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

434.zeusmp: basepeak = yes
437.leslie3d: basepeak = yes
459.GemsFDTD: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll2 -inline-level=0 -gopt-prefetch -parallel

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

Continued on next page
Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes
436.cactusADM: basepeak = yes
454.calculix: basepeak = yes
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/Intel-ic17.0-official-linux64.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/Intel-ic17.0-official-linux64.xml

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For other inquiries, please contact webmaster@spec.org.

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