**SPEC® CFP2006 Result**

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML350 Gen9
(3.20 GHz, Intel Xeon E5-2667 v4)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECfp2006</th>
<th>SPECfp_base2006</th>
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<tbody>
<tr>
<td>410.bwaves</td>
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<tr>
<td>416.gamess</td>
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<td>433.milc</td>
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**CPU2006 license:** 3
**Test date:** May-2016

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ProLiant ML350 Gen9
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</table>

**Software**

**Operating System:** SUSE Linux Enterprise Server 12 (x86_64) SP1
**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
**Auto Parallel:** Yes
**File System:** xfs
**System State:** Run level 3 (multi-user)

**Hardware**

**CPU Name:** Intel Xeon E5-2667 v4
**CPU Characteristics:** Intel Turbo Boost Technology up to 3.60 GHz
**CPU MHz:** 3200
**FPU:** Integrated
**CPU(s) enabled:** 16 cores, 2 chips, 8 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

Continued on next page
Hewlett Packard Enterprise
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ProLiant ML350 Gen9
(3.20 GHz, Intel Xeon E5-2667 v4)

SPEC CFP2006 Result
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CPU2006 license: 3
Test sponsor: HPE
Tested by: HPE

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 800 GB SAS SSD, RAID 0
Other Hardware: None

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

Results Table

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<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
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<th>Seconds</th>
<th>Ratio</th>
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</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:
- Intel Hyperthreading Option set to Disabled
- Power Profile set to Balanced Power and Performance
- QPI Snooq Configuration set to Home Snooq
- Thermal Configuration set to Maximum Cooling
- Processor Power and Utilization Monitoring set to Disabled
- Memory Double Refresh Rate set to 1x Refresh
- Collaborative Power Control set to Disabled

Continued on next page
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SPECfp2006 = 130  
SPECfp_base2006 = 126  

CPU2006 license: 3  
Test date: May-2016  
Test sponsor: HPE  
Hardware Availability: Mar-2016  
Tested by: HPE  
Software Availability: Dec-2015  

Platform Notes (Continued)

Sysinfo program  
/home/specuser/cpu2006/HP_build_ic16_suite_corrected_int_bins_round_2/cpu2006/config/sysinfo.rev6914  
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e8219e1  
running on linux-szds Tue May 17 20:43:58 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)  
16 "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 : 8  
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: 264330168 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:  
(8d714a0) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 May 17 20:22  
Continued on next page
SPEC CFP2006 Result

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Test sponsor: HPE
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Test date: May-2016
Hardware Availability: Mar-2016
Software Availability: Dec-2015

Platform Notes (Continued)

SPEC is set to:
/home/specuser/cpu2006/HP_build_ic16_suite_corrected_int_bins_round_2/cpu2006

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda4      xfs   703G  290G  413G  42% /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 P92 03/23/2016
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"
OMP_NUM_THREADS = "16"

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
**SPEC CFP2006 Result**

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(3.20 GHz, Intel Xeon E5-2667 v4)

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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.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 -nosfor_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 -qopt-prefetch-issue-excl-hint

C++ benchmarks:
- -xCORE-AVX2 -ipo -O3 -no-prec-div -static -opt-prefetch -ansi-alias

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 -qopt-prefetch-issue-excl-hint
- -fp-model fast=2

**Peak Compiler Invocation**

C benchmarks:
- icc -m64

C++ benchmarks:
- icpc -m64
Hewlett Packard Enterprise  
(Test Sponsor: HPE) 
ProLiant ML350 Gen9  
(3.20 GHz, Intel Xeon E5-2667 v4)  

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

Test date: May-2016  
Hardware Availability: Mar-2016  
Software Availability: Dec-2015

Peak Compiler Invocation (Continued)

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: -xCORE-AVX2 -ipo -O3 -no-prec-div -static -parallel
-opt-prefetch
-fp-model fast=2
-qopt-prefetch-issue-excl-hint -funroll-all-loops

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-

Continued on next page
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-Compiler-Flags-Intel-V1.2-BDW-revF.html
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/HP-Compiler-Flags-Intel-V1.2-BDW-revF.xml
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.xml

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For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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