Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen9
(3.20 GHz, Intel Xeon E5-2667 v4)

SPECfp®2006 = 127
SPECfp_base2006 = 124

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

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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, 2 threads/core
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: Red Hat Enterprise Linux Server release 7.2, (Maipo)
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

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## SPEC CFP2006 Result

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<table>
<thead>
<tr>
<th>L3 Cache: 25 MB I+D on chip per chip</th>
<th>System State: Run level 3 (multi-user)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Cache: None</td>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Memory: 512 GB (16 x 32 GB 2Rx4 PC4-2400T-R)</td>
<td>Peak Pointers: 32/64-bit</td>
</tr>
<tr>
<td>Disk Subsystem: 1 x 400 GB SAS SSD, RAID 0</td>
<td>Other Software: None</td>
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<tr>
<td>Other Hardware: None</td>
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</table>

<table>
<thead>
<tr>
<th>CPU2006 license: 3</th>
<th>Test date: May-2016</th>
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<tbody>
<tr>
<td>Test sponsor: HPE</td>
<td>Hardware Availability: Mar-2016</td>
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<tr>
<td>Tested by: HPE</td>
<td>Software Availability: Nov-2015</td>
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### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
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<td>592</td>
<td>23.5</td>
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<td>459.GemsFDTD</td>
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<td>465.tonto</td>
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<td>470.lbm</td>
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<td>481.wrf</td>
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<td>92.5</td>
<td>211</td>
<td>92.2</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:
HP Power Profile set to Custom
HP Power Regulator to HP Static High Performance Mode
Minimum Processor Idle Power Core C-State set to CLE State
Minimum Processor Idle Package C-State set to No Package State
QPI Snoop Configuration set to Home Snoop
Collaborative Power Control set to Disabled
Thermal Configuration set to Maximum Cooling

Continued on next page
Platform Notes (Continued)

Processor Power and Utilization Monitoring set to Disabled
Memory Refresh Rate set to 1x Refresh

Sysinfo program /home/new_fp/cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 $ e3fbb8667b5a285932ceab81e28219e1
running on DL380Gen9allbin Mon May 9 23:00:59 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
cautiuon.)
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:       528066700 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
os-release:
  NAME="Red Hat Enterprise Linux Server"
  VERSION="7.2 (Maipo)"
  ID="rhel"
  ID_LIKE="fedora"
  VERSION_ID="7.2"
  PRETTY_NAME="Red Hat Enterprise Linux Server 7.2 (Maipo)"
  ANSI_COLOR="0;31"
  CPE_NAME=cpe:/o:redhat:enterprise_linux:7.2:GA:server"
redhat-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)

uname -a:
Linux DL380Gen9allbin 3.10.0-327.el7.x86_64 #1 SMP Thu Oct 29 17:29:29 EDT
2015 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 May 9 22:38

SPEC is set to: /home/new_fp/cpu2006
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda5 xfs 318G 134G 185G 42% /home
Continued on next page
SPECCFP2006 Result

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

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

Platform Notes (Continued)

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 P89 03/23/2016
Memory:
8x UNKNOWN NOT AVAILABLE
16x UNKNOWN NOT AVAILABLE 32 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 512 GB and the dmidecode description should have one line reading as:
16x UNKNOWN NOT AVAILABLE 32 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 = "16"
LD_LIBRARY_PATH = "/home/new_fp/cpu2006/libs/32:/home/new_fp/cpu2006/libs/64:/home/new_fp/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:
\texttt{icc} -m64

C++ benchmarks:
\texttt{icpc} -m64

Fortran benchmarks:
\texttt{ifort} -m64

Benchmarks using both Fortran and C:
\texttt{icc} -m64 \texttt{ifort} -m64

Base Portability Flags

410.bwaves: \texttt{-DSPEC_CPU_LP64}
416.gamess: \texttt{-DSPEC_CPU_LP64}
433.milc: \texttt{-DSPEC_CPU_LP64}

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SPEC CFP2006 Result

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Base Portability Flags (Continued)

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
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

Fortran benchmarks:
ifort -m64

Continued on next page
/Peak Compiler Invocation (Continued)

Benchmarks using both Fortran and C:

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

**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-
SPEC CFP2006 Result

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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-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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