Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen9
(2.60 GHz, Intel Xeon E5-2623 v4)

SPEC® CFP2006 Result

**SPECfpp_rate2006 = 357**

**SPECfpp_rate_base2006 = 351**

<table>
<thead>
<tr>
<th>Software</th>
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<tr>
<td>Operating System:</td>
<td>Red Hat Enterprise Linux Server release 7.2 (Maipo)</td>
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<td>Kernel:</td>
<td>3.10.0-327.el7.x86_64</td>
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<td>Compiler:</td>
<td>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</td>
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<td>Auto Parallel:</td>
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<td>File System:</td>
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<th>Hardware</th>
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<tbody>
<tr>
<td>CPU Name:</td>
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<tr>
<td>CPU Characteristics:</td>
<td>Intel Turbo Boost Technology up to 3.20 GHz</td>
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<td>CPU(s) enabled:</td>
<td>8 cores, 2 chips, 4 cores/chip, 2 threads/core</td>
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<td>CPU(s) orderable:</td>
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<td>Primary Cache:</td>
<td>32 KB I + 32 KB D on chip per core</td>
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<tr>
<td>Secondary Cache:</td>
<td>256 KB I+D on chip per core</td>
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| Test date: | Jun-2016 |
| Hardware Availability: | Mar-2016 |
| Software Availability: | Nov-2015 |

| SPECfp_rate2006 | 357 |
| SPECfp_rate_base2006 | 351 |

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

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| SPECfp_rate_base2006 | 351 |

| SPECfpp_rate2006 | 357 |

**Continued on next page**
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen9
(2.60 GHz, Intel Xeon E5-2623 v4)

SPECfp_rate2006 = 357
SPECfp_rate_base2006 = 351

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</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 with:
echo always > /sys/kernel/mm/transparent_hugepage/enabled
Filesystem page cache cleared with:
echo 1> /proc/sys/vm/drop_caches
runspec command invoked through numactl i.e.:
numactl --interleave=all runspec <etc>
Hewlett Packard Enterprise
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ProLiant DL360 Gen9
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SPEC CFP2006 Result

SPECfp_rate2006 = 357
SPECfp_rate_base2006 = 351

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

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

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 C1E State
Minimum Processor Idle Power Package C-State set to No Package State
QPI Snoop Configuration set to Cluster on Die
Collaborative Power Control set to Disabled
Thermal Configuration set to Maximum Cooling
Processor Power and Utilization Monitoring set to Disabled
Memory Refresh Rate set to 1x Refresh
Energy/Performance Bias set to Balanced Performance

Sysinfo program /cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on localhost.localdomain Thu Jun 16 21:44:32 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 E5-2623 v4@ 2.60GHz
2 "physical id"s (chips)
16 "processors"
core, siblings (Caution: counting these is hw and system dependent. The
following excerpts from /proc/cpuinfo might not be reliable. Use with
cautions.)
cpu cores : 4
siblings : 8
physical 0: cores 0 1 2 3
physical 1: cores 0 1 2 3
cache size : 10240 KB

From /proc/meminfo
MemTotal: 528068696 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:
### Platform Notes (Continued)

Linux localhost.localdomain 3.10.0-327.e17.x86_64 #1 SMP Thu Oct 29 17:29:29 EDT 2015 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jun 16 11:28

SPEC is set to: /cpu2006

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<th>Type</th>
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<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
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<tbody>
<tr>
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<td>263G</td>
<td>105G</td>
<td>72%</td>
<td>/</td>
</tr>
</tbody>
</table>

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 04/12/2016
Memory:
8x UNKNOWN NOT AVAILABLE
16x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2400 MHz, configured at 2133 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, configured at 2133 MHz

### General Notes

Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/cpu2006/libs/32:/cpu2006/libs/64:/cpu2006/sh"

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB memory using RedHat EL 7.1

### 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
```
Hewlett Packard Enterprise
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ProLiant DL360 Gen9
(2.60 GHz, Intel Xeon E5-2623 v4)

SPECfp_rate2006 = 357
SPECfp_rate_base2006 = 351

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

Base Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.games: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64
436.cactusADM: -DSPEC_CPU_LP64
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
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 -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3

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

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

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

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:

```
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) 
  -opt-mem-layout-trans=3(pass 2) 
  -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) 
  -opt-mem-layout-trans=3(pass 2) 
  -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-

- `434.zeusmp`: basepeak = yes
- `437.leslie3d`: basepeak = yes
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(2.60 GHz, Intel Xeon E5-2623 v4)

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Software Availability: Nov-2015

Peak Optimization Flags (Continued)

459.GemsFDTD: basepeak = yes
465.tonto: -xCORE-AVX2(pas 2) -prof-gen:threadsafe(pas 1)
           -ipo(pas 2) -O3(pas 2) -no-prec-div(pas 2)
           -par-num-threads=1(pas 1) -prof-use(pas 2) -unroll4 -auto
           -inline-calloc -opt-malloc-options=3

Benchmarks using both Fortran and C:

435.gromacs: -xCORE-AVX2(pas 2) -prof-gen:threadsafe(pas 1)
             -ipo(pas 2) -O3(pas 2) -no-prec-div(pas 2)
             -par-num-threads=1(pas 1) -opt-mem-layout-trans=3(pas 2)
             -prof-use(pas 2) -opt-prefetch -auto-ilp32

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-ic16.0-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-ic16.0-official-linux64.xml

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

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