### SPEC® CFP2006 Result

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)

**ProLiant DL360 Gen10**
(1.70 GHz, Intel Xeon Bronze 3106)

<table>
<thead>
<tr>
<th>SPECfp®_rate2006 = Not Run</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_rate_base2006 = 475</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU2006 license: 3</th>
<th>Test date: Nov-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested by: HPE</td>
<td>Hardware Availability: Oct-2017</td>
</tr>
</tbody>
</table>

#### Hardware
- **CPU Name:** Intel Xeon Bronze 3106
- **CPU Characteristics:**
  - CPU MHz: 1700
  - FPU: Integrated
  - CPU(s) enabled: 16 cores, 2 chips, 8 cores/chip
  - 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

#### Software
- **Operating System:** SUSE Linux Enterprise Server 12 (x86_64) SP2 Kernel 4.4.21-68-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:** xfs
- **System State:** Run level 3 (multi-user)

#### Performance Results

<table>
<thead>
<tr>
<th>Program</th>
<th>Rate Base 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>16</td>
</tr>
<tr>
<td>416.gamess</td>
<td>16</td>
</tr>
<tr>
<td>433.milc</td>
<td>16</td>
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<td>434.zeusmp</td>
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<td>435.gromacs</td>
<td>16</td>
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<tr>
<td>436.cactusADM</td>
<td>16</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>16</td>
</tr>
<tr>
<td>444.namd</td>
<td>16</td>
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<tr>
<td>447.dealII</td>
<td>16</td>
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<tr>
<td>450.soplex</td>
<td>16</td>
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<td>453.povray</td>
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<td>454.calculix</td>
<td>16</td>
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<tr>
<td>459.GemsFDTD</td>
<td>16</td>
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<tr>
<td>465.tonto</td>
<td>16</td>
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<tr>
<td>470.lbm</td>
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<tr>
<td>481.wrf</td>
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<td>482.sphinx3</td>
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</table>

**SPECfp_rate_base2006 = 475**

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SPECCFp_rate2006 = Not Run
SPECFp_rate_base2006 = 475

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(Test Sponsor: HPE)
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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 2133)
Disk Subsystem: 1 x 600 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>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>362</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"
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SPECfp_rate_base2006 = 475

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
- LLC Prefetch set to Enabled
- LLC Dead Line Allocation set to Disabled
- Memory Patrol Scrubbing 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 /home/cpu2006/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on linux-perm Sun Nov 12 16:39:55 2017

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) Bronze 3106 CPU @ 1.70GHz
- 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 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: 197751660 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

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 release.
  # Please check /etc/os-release for details about this release.
- os-release:
  NAME="SLES"

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**Platform Notes (Continued)**

```
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:
Linux linux-perm 4.4.21-68-default #1 SMP Tue Oct 18 18:19:37 UTC 2016
(63cf368) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Nov 12 11:05
```

SPEC is set to: /home/cpu2006

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda4      xfs   517G   71G  446G  14% /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 HPE U32 09/29/2017  
Memory:
24x UNKNOWN NOT AVAILABLE 8 GB 2 rank 2666 MHz, configured at 2133 MHz

(End of data from sysinfo program)

---

**General Notes**

Environment variables set by runspec before the start of the run:

```
LD_LIBRARY_PATH = "/home/cpu2006/lib/ia32:/home/cpu2006/lib/intel64:/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
```
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Test date: Nov-2017
Hardware Availability: Oct-2017
Software Availability: Apr-2017

Base Compiler Invocation (Continued)

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

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-revG.html
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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-revG.xml

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