**SPEC® CPU2017 Integer Speed Result**

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)
ProLiant DL360 Gen10
(3.40 GHz, Intel Xeon Gold 6128)

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS: Red Hat Enterprise Linux Server release 7.3 (Maipo)</td>
<td>CPU Name: Intel Xeon Gold 6128</td>
</tr>
<tr>
<td>Kernel 3.10.0-514.el7.x86_64</td>
<td>Max MHz.: 3700</td>
</tr>
<tr>
<td>Compiler: C/C++: Version 18.0.0.128 of Intel C/C++</td>
<td>Nominal: 3400</td>
</tr>
<tr>
<td>Compiler for Linux: Fortran: Version 18.0.0.128 of Intel Fortran</td>
<td>Enabled: 12 cores, 2 chips</td>
</tr>
<tr>
<td>Compiler for Linux</td>
<td>Orderable: 1, 2 chip(s)</td>
</tr>
<tr>
<td>Parallel: Yes</td>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>File System: xfs</td>
<td>L3: 19.25 MB I+D on chip per chip</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
<td>Other: None</td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
<td>Memory: 192 GB (24 x 8 GB 2Rx8 PC4-2666V-R)</td>
</tr>
<tr>
<td>Peak Pointers: Not Applicable</td>
<td>Storage: 1 x 480 GB SATA SSD, RAID 0</td>
</tr>
<tr>
<td>Other: jemalloc: jemalloc memory allocator library V5.0.1; jemalloc: configured and built at default for 32bit (i686) and 64bit (x86_64) targets; jemalloc: built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5;jemalloc: sources available from jemalloc.net or releases</td>
<td></td>
</tr>
</tbody>
</table>

| SPECspeed2017_int_base = 8.32 |

| SPECspeed2017_int_peak = Not Run |

**Threads**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_int_base</th>
</tr>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>12</td>
<td>6.10</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>12</td>
<td>8.90</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>12</td>
<td>5.66</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>12</td>
<td>9.19</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>12</td>
<td>11.7</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>12</td>
<td>5.06</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>12</td>
<td>4.33</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>12</td>
<td>13.3</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>12</td>
<td>15.0</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>12</td>
<td>SPECspeed2017_int_base (8.32)</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Dec-2017

**Hardware Availability:** Oct-2017

**Software Availability:** Sep-2017
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SPECspeed2017_int_base = 8.32
SPECspeed2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Seconds</th>
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<th>Ratio</th>
</tr>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>12</td>
<td>291</td>
<td>6.09</td>
<td>291</td>
<td>6.10</td>
<td>288</td>
<td>6.16</td>
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<tr>
<td>602.gcc_s</td>
<td>12</td>
<td>457</td>
<td>8.72</td>
<td>444</td>
<td>8.97</td>
<td>447</td>
<td>8.90</td>
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<tr>
<td>605.mcf_s</td>
<td>12</td>
<td>430</td>
<td>11.0</td>
<td>427</td>
<td>11.1</td>
<td>430</td>
<td>11.0</td>
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<tr>
<td>620.omnetpp_s</td>
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<td>288</td>
<td>5.66</td>
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<tr>
<td>623.xalancbmk_s</td>
<td>12</td>
<td>154</td>
<td>9.18</td>
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<td>9.19</td>
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<td>9.22</td>
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<td>12</td>
<td>151</td>
<td>11.7</td>
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<td>11.6</td>
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<td>11.7</td>
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<tr>
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<td>12</td>
<td>283</td>
<td>5.06</td>
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<td>283</td>
<td>5.06</td>
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<tr>
<td>641.leela_s</td>
<td>12</td>
<td>394</td>
<td>4.33</td>
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<td>4.33</td>
<td>395</td>
<td>4.32</td>
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<tr>
<td>648.exchange2_s</td>
<td>12</td>
<td>221</td>
<td>13.3</td>
<td>220</td>
<td>13.4</td>
<td>221</td>
<td>13.3</td>
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<tr>
<td>657.xz_s</td>
<td>12</td>
<td>412</td>
<td>15.0</td>
<td>411</td>
<td>15.0</td>
<td>408</td>
<td>15.1</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></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 by default
Filesystem page cache cleared with:
shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
irqbalance disabled with "systemctl stop irqbalance"
tuned profile set with "tuned-adm profile throughput-performance"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/specuser/cpu2017/lib/ia32:/home/specuser/cpu2017/lib/intel64"
LD_LIBRARY_PATH="$LD_LIBRARY_PATH:/home/specuser/cpu2017/je5.0.1-32:/home/specuser/cpu2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.4

Platform Notes

Intel Configuration:
   Intel Hyperthreading set to Disabled
   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 Peak Frequency Compute

(Continued on next page)
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## Platform Notes (Continued)

Energy/Performance Bias set to Maximum Performance  
Workload Profile set to Custom  
NUMA Group Size Optimization set to Flat  
Sysinfo program /home/specuser/cpu2017/bin/sysinfo  
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bce091c0f  
running on dl360Gen10rhe173Unit2 Thu Dec 7 08:28:58 2017

SUT (System Under Test) info as seen by some common utilities.  
For more information on this section, see  
https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo  
model name : Intel(R) Xeon(R) Gold 6128 CPU @ 3.40GHz  
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 6 9 10 11 13  
  physical 1: cores 0 6 9 10 11 13

From lscpu:  
Architecture: x86_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 12  
On-line CPU(s) list: 0-11  
Thread(s) per core: 1  
Core(s) per socket: 6  
Socket(s): 2  
NUMA node(s): 2  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Gold 6128 CPU @ 3.40GHz  
Stepping: 4  
CPU MHz: 3400.000  
BogoMIPS: 6806.55  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 19712K  
NUMA node0 CPU(s): 0-5  
NUMA node1 CPU(s): 6-11

(Continued on next page)
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**SPECspeed2017_int_base = 8.32**

**SPECspeed2017_int_peak = Not Run**

### Platform Notes (Continued)

/proc/cpuinfo cache data
  
  cache size : 19712 KB

From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
  physical chip.

From /proc/meminfo
  MemTotal: 197575360 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux Server"
    VERSION="7.3 (Maipo)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="7.3"
    PRETTY_NAME="Red Hat Enterprise Linux Server 7.3 (Maipo)"
    ANSI_COLOR="0;31"
    CPE_NAME="cpe:/o:redhat:enterprise_linux:7.3:GA:server"
  redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
  system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)

uname -a:  
  Linux dl360gen10rhel73unit2 3.10.0-514.el7.x86_64 #1 SMP Wed Oct 19 11:24:13 EDT 2016  
  x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Dec 7 02:13

SPEC is set to: /home/specuser/cpu2017
  Filesystem          Type Size Used Avail Use% Mounted on
  /dev/mapper/rhel-home xfs 392G 36G 357G 10% /home

Additional information from dmidecode follows.  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

(End of data from sysinfo program)
### Compiler Version Notes

```plaintext
CC 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base)
    657.xz_s(base)

icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
    641.leela_s(base)

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

FC 648.exchange2_s(base)

ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

### Base Compiler Invocation

- **C benchmarks:**
  - icc

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

- **Fortran benchmarks:**
  - ifort

### Base Portability Flags

- `600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64`
- `602.gcc_s: -DSPEC_LP64`
- `605.mcf_s: -DSPEC_LP64`
- `620.omnetpp_s: -DSPEC_LP64`
- `623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX`
- `625.x264_s: -DSPEC_LP64`
- `631.deepsjeng_s: -DSPEC_LP64`

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Base Portability Flags (Continued)

641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc

Base Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.xml
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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU2017 v1.0.2 on 2017-12-07 09:28:57-0500.