**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL360 Gen10  
(2.70 GHz, Intel Xeon Gold 6150)  

<table>
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<tr>
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<th>Oct-2017</th>
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<td>Hardware Availability:</td>
<td>Oct-2017</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Sep-2017</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 3  
**Test Sponsor:** HPE  
**Tested by:** HPE  

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### Hardware

- **CPU Name:** Intel Xeon Gold 6150  
- **Max MHz.:** 3700  
- **Nominal:** 2700  
- **Enabled:** 36 cores, 2 chips  
- **Orderable:** 1, 2 chip(s)  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **L2:** 1 MB I+D on chip per core  
- **L3:** 24.75 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 192 GB (24 x 8 GB 2Rx8 PC4-2666V-R)  
- **Storage:** 1 x 480 GB SATA SSD, RAID 0  
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux Server release 7.3 (Maipo)  
- **Kernel:** 3.10.0-514.el7.x86_64  
- **Compiler:** C/C++: Version 18.0.0.128 of Intel C/C++  
- **Compiler for Linux:** Fortran: Version 18.0.0.128 of Intel Fortran  
- **Compiler for Linux:**  
- **Parallel:** Yes  
- **Firmware:** HPE BIOS Version U32 released Oct-2017 (tested with U32 9/29/2017)  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **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

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### SPEC Speed 2017 Integer Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_int_base</th>
<th>SPECspeed2017_int_peak</th>
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</thead>
<tbody>
<tr>
<td>perlbench</td>
<td>36</td>
<td>36</td>
<td>8.80</td>
</tr>
<tr>
<td>gcc</td>
<td>36</td>
<td>36</td>
<td>Not Run</td>
</tr>
<tr>
<td>mcf</td>
<td>36</td>
<td>36</td>
<td>8.80</td>
</tr>
<tr>
<td>omnetpp</td>
<td>36</td>
<td>36</td>
<td>8.80</td>
</tr>
<tr>
<td>xalancbmk</td>
<td>36</td>
<td>36</td>
<td>8.80</td>
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<tr>
<td>x264</td>
<td>36</td>
<td>36</td>
<td>8.80</td>
</tr>
<tr>
<td>deepsjeng</td>
<td>36</td>
<td>36</td>
<td>8.80</td>
</tr>
<tr>
<td>leela</td>
<td>36</td>
<td>36</td>
<td>8.80</td>
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<tr>
<td>exchange2</td>
<td>36</td>
<td>36</td>
<td>8.80</td>
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<tr>
<td>xz</td>
<td>36</td>
<td>36</td>
<td>8.80</td>
</tr>
</tbody>
</table>

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**Note:** All benchmarks were run with 8.80 threads.
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SPECspeed2017_int_base = 8.80  
SPECspeed2017_int_peak = Not Run  

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base</th>
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<th></th>
<th>Peak</th>
<th></th>
<th></th>
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<tbody>
<tr>
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<td>Ratio</td>
<td>Seconds</td>
<td>Ratio</td>
<td>Seconds</td>
<td>Ratio</td>
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<tr>
<td>600.perlbench_s</td>
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<td>288</td>
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<td>285</td>
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<td>602.gcc_s</td>
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<td>605.mcf_s</td>
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<td>420</td>
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<td>620.omnetpp_s</td>
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<td>623.xalancbmk_s</td>
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<tr>
<td>625.x264_s</td>
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<td>283</td>
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<td>283</td>
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<tr>
<td>641.leela_s</td>
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<td>648.exchange2_s</td>
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<td>657.xz_s</td>
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<td>285</td>
<td>21.7</td>
<td>287</td>
<td>21.6</td>
<td>282</td>
<td>21.9</td>
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</tbody>
</table>

SPECspeed2017_int_base = 8.80  
SPECspeed2017_int_peak = Not Run  

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

BIOS Configuration:  
Intel Hyperthreading set to Disabled  
Thermal Configuration set to Maximum Cooling  
Memory Patrol Scrubbing set to Disabled  
LLC Prefetcher set to Enabled  
LLC Dead Line Allocation set to Disabled  
Workload Profile set to General Peak Frequency Compute

(Continued on next page)
Platform Notes (Continued)

Energy/Performance Bias set to Maximum Performance
Uncore Frequency Scaling set to Auto
Workload Profile set to General Peak Frequency Compute
NUMA Group Size Optimization set to Flat

Sysinfo program /home/specuser/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on dl360Gen10rhel73Unit2 Sun Oct 15 13:57:15 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 6150 CPU @ 2.70GHz
  2 "physical id"s (chips)
  36 "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 : 18
siblings : 18
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

From lscpu:
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                36
On-line CPU(s) list:   0-35
Thread(s) per core:    1
Core(s) per socket:    18
Socket(s):             2
NUMA node(s):          2
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Gold 6150 CPU @ 2.70GHz
Stepping:              4
CPU MHz:               2700.000
BogoMIPS:              5405.50
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              25344K
NUMA node0 CPU(s):     0-17

(Continued on next page)
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SPEC CPU2017 Integer Speed Result

SPECspeed2017_int_base = 8.80
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Platform Notes (Continued)

NUMA node1 CPU(s): 18-35

/proc/cpuinfo cache data
cache size : 25344 KB

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

From /proc/meminfo
MemTotal: 197571680 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*

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 Oct 13 13:15

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)
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**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.  
------------------------------------------------------------------------------
(Continued on next page)
```

**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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**SPECspeed2017_int_base = 8.80**

**SPECspeed2017_int_peak = Not Run**

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**Base Portability Flags (Continued)**

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

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**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/Intel-ic18.0-official-linux64.html

http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revB.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.xml

http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revB.xml
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<th>Value</th>
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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 2017-10-15 14:57:15-0400.  
Originally published on 2017-10-31.