### SPEC CPU®2017 Integer Speed Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL360 Gen10  
(2.20 GHz, Intel Xeon Platinum 8276L)  

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>10.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 3  
**Test Date:** Jun-2019  
**Test Sponsor:** HPE  
**Hardware Availability:** Apr-2019  
**Tested by:** HPE  
**Software Availability:** Feb-2019  

<table>
<thead>
<tr>
<th>Test</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base (10.2)</th>
</tr>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>112</td>
<td>6.98</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>112</td>
<td>9.66</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>112</td>
<td>12.6</td>
</tr>
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<td>620.omnetpp_s</td>
<td>112</td>
<td>9.39</td>
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<tr>
<td>623.xalancbmk_s</td>
<td>112</td>
<td>12.5</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>112</td>
<td>14.6</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>112</td>
<td>5.52</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>112</td>
<td>4.85</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>112</td>
<td>14.3</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>112</td>
<td>23.0</td>
</tr>
</tbody>
</table>

**Hardware**  
**CPU Name:** Intel Xeon Platinum 8276L  
**Max MHz:** 4000  
**Nominal:** 2200  
**Enabled:** 56 cores, 2 chips, 2 threads/core  
**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:** 38.5 MB I+D on chip per chip  
**Other:** None  
**Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R)  
**Storage:** 1 x 400 GB SAS SSD, RAID 0  
**Other:** None

**Software**  
**OS:** SUSE Linux Enterprise Server 15 (x86_64)  
**Kernel:** 4.12.14-23-default  
**Compiler:** C/C++: Version 19.0.2.187 of Intel C/C++ Compiler Build 20190117 for Linux; Fortran: Version 19.0.2.187 of Intel Fortran Compiler Build 20190117 for Linux  
**Parallel:** Yes  
**Firmware:** HPE BIOS Version U32 02/02/2019 released Apr-2019  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** Not Applicable  
**Other:** jemalloc memory allocator V5.0.1  
**Power Management:** --
Hewlett Packard Enterprise
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SPEC CPU®2017 Integer Speed Result
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SPECspeed®2017_int_base = 10.2
SPECspeed®2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
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<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>113</td>
<td>12.5</td>
<td>113</td>
<td>12.5</td>
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<td>625.x264_s</td>
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<tr>
<td>631.deepsjeng_s</td>
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<td></td>
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<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
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
sync; echo 3> /proc/sys/vm/drop_caches

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017_u2/lib/ia32:/home/cpu2017_u2/lib/intel64:
/home/cpu2017_u2/je5.0.1-32:/home/cpu2017_u2/je5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.
jemalloc, a general purpose malloc implementation built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Submitted_by: "Bucek, James" <james.bucek@hpe.com>
Submitted: Tue Oct 15 17:17:28 EDT 2019

(Continued on next page)
## SPEC CPU®2017 Integer Speed Result

**Hewlett Packard Enterprise**  
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ProLiant DL360 Gen10  
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**SPECspeed®2017_int_base** = 10.2  
**SPECspeed®2017_int_peak** = Not Run

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

### General Notes (Continued)

Submission: cpu2017-20190819-16847.sub

### Platform Notes

- **BIOS Configuration:**
  - Thermal Configuration set to Maximum Cooling
  - Memory Patrol Scrubbing set to Disabled
  - LLC Prefetch set to Enabled
  - LLC Dead Line Allocation set to Disabled
  - Enhanced Processor Performance set to Enabled
  - Workload Profile set to General Peak Frequency Compute
  - Minimum Processor Idle Power Core C-State set to C1E State
  - Energy/Performance Bias set to Balanced Power
  - Workload Profile set to Custom
  - Numa Group Size Optimization set to Flat

- **Sysinfo program** /home/cpu2017_u2/bin/sysinfo
  - Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
  - running on linux-nub3 Tue Jun 18 20:32:47 2019

- **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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

- From /proc/cpuinfo:
  - model name: Intel(R) Xeon(R) Platinum 8276L CPU @ 2.20GHz
  - 2 "physical id"s (chips)
  - 112 "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: 28
      - siblings: 56
      - physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
      - physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
  - 28 29 30

- From lscpu:
  - Architecture: x86_64
  - CPU op-mode(s): 32-bit, 64-bit
  - Byte Order: Little Endian
  - CPU(s): 112
  - On-line CPU(s) list: 0-111
  - Thread(s) per core: 2
  - Core(s) per socket: 28
  - Socket(s): 2
  - NUMA node(s): 2

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

- **Vendor ID:** GenuineIntel
- **CPU family:** 6
- **Model:** 85
- **Model name:** Intel(R) Xeon(R) Platinum 8276L CPU @ 2.20GHz
- **Stepping:** 7
- **CPU MHz:** 2200.000
- **BogoMIPS:** 4400.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 39424K

**NUMA node0 CPU(s):** 0-27, 56-83
**NUMA node1 CPU(s):** 28-55, 84-111

**Flags:**

```
fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdmb fma cx16 xtrr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt
```

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

```
<table>
<thead>
<tr>
<th>available</th>
<th>node 0 cpus</th>
<th>node 0 size</th>
<th>node 0 free</th>
<th>node 1 cpus</th>
<th>node 1 size</th>
<th>node 1 free</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 nodes</td>
<td>0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27</td>
<td>193111 MB</td>
<td>192458 MB</td>
<td>28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52</td>
<td>193495 MB</td>
<td>193258 MB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>node distances:</th>
<th>node 0</th>
<th>node 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>0: 10 21</td>
<td>1: 21 10</td>
<td></td>
</tr>
</tbody>
</table>
```

From `/proc/meminfo`
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SPECSpeed®2017_int_base = 10.2
SPECSpeed®2017_int_peak = Not Run

Platform Notes (Continued)

MemTotal: 395885460 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*/version*
  os-release:
    NAME="SLES"
    VERSION="15"
    VERSION_ID="15"
    PRETTY_NAME="SUSE Linux Enterprise Server 15"
    ID="sles"
    ID_LIKE="suse"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:15"

uname -a:
Linux linux-nub3 4.12.14-23-default #1 SMP Tue May 29 21:04:44 UTC 2018 (cd0437b)
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Not affected
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

run-level 3 Jun 18 20:30

SPEC is set to: /home/cpu2017_u2
  Filesystem   Type  Size  Used Avail Use% Mounted on
  /dev/sda1    xfs     373G 130G 244G  35% /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 02/02/2019
  Memory:
    24x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes
==============================================================================
| C   | 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) |
(Continued on next page)
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Hardware Availability: Apr-2019
Software Availability: Feb-2019

Compiler Version Notes (Continued)

| 625.x264_s(base) 657.xz_s(base) |
---------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
---------------------------------------------------------------

C++ | 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
| 641.leela_s(base)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
---------------------------------------------------------------

Fortran | 648.exchange2_s(base)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

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

(Continued on next page)
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Base Portability Flags (Continued)

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

Base Optimization Flags

C benchmarks:
-W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-L/home/cpu2017_u2/je5.0.1-64/ -ljemalloc

C++ benchmarks:
-W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

Fortran benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/HPE-ic19.0u1-flags-linux64-revB.html
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-CLX-revB.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/HPE-ic19.0u1-flags-linux64-revB.xml
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-CLX-revB.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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