## SPEC CPU®2017 Integer Speed Result

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

ProLiant DL380 Gen10
(2.20 GHz, Intel Xeon Platinum 8276L)

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Jun-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Nov-2018</td>
</tr>
</tbody>
</table>

### SPECspeed®2017_int_base = 10.2

### SPECspeed®2017_int_peak = Not Run

### Hardware

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_int_base (10.2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10.2</td>
</tr>
<tr>
<td>1</td>
<td>12.2</td>
</tr>
<tr>
<td>2</td>
<td>14.7</td>
</tr>
<tr>
<td>3</td>
<td>16.6</td>
</tr>
<tr>
<td>4</td>
<td>18.5</td>
</tr>
<tr>
<td>5</td>
<td>20.4</td>
</tr>
<tr>
<td>6</td>
<td>22.3</td>
</tr>
<tr>
<td>7</td>
<td>24.2</td>
</tr>
</tbody>
</table>

### Software

**OS:** SUSE Linux Enterprise Server 15 (x86_64)
Kernel 4.12.14-23-default

**Compiler:** C/C++: Version 19.0.1.144 of Intel C/C++
Compiler Build 20181018 for Linux;
Fortran: Version 19.0.1.144 of Intel Fortran
Compiler Build 20181018 for Linux;

**Parallel:** Yes

**Firmware:** HPE BIOS Version U30 04/18/2019 released Apr-2019

**File System:** btrfs

**System State:** Run level 3 (multi-user)

**Base Pointers:** 64-bit

**Peak Pointers:** Not Applicable

**Other:** jemalloc memory allocator V5.0.1

**Power Management:** --

### Benchmarks

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_s</td>
<td>56</td>
<td>6.93</td>
</tr>
<tr>
<td>gcc_s</td>
<td>56</td>
<td>9.02</td>
</tr>
<tr>
<td>mcf_s</td>
<td>56</td>
<td>12.2</td>
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<tr>
<td>omnetpp_s</td>
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<td>9.40</td>
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<tr>
<td>xalancbmk_s</td>
<td>56</td>
<td>12.6</td>
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<td>x264_s</td>
<td>56</td>
<td>14.7</td>
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<td>deepsjeng_s</td>
<td>56</td>
<td>5.52</td>
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<tr>
<td>leela_s</td>
<td>56</td>
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<tr>
<td>exchange2_s</td>
<td>56</td>
<td>14.5</td>
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<tr>
<td>xz_s</td>
<td>56</td>
<td>23.6</td>
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</table>

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Test Date:** Jun-2019

**Hardware Availability:** Apr-2019

**Software Availability:** Nov-2018

**Tested by:** HPE

**CPU Name:** Intel Xeon Platinum 8276L

**Max MHz:** 4000

**Nominal:** 2200

**Enabled:** 56 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:** 38.5 MB I+D on chip per chip

**Other:** None

**Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)

**Storage:** 1 x 960 GB SATA SSD, RAID 0

**Other:** None
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ProLiant DL380 Gen10
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SPECspeed®2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
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<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>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
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<td>6.89</td>
<td>256</td>
<td>6.93</td>
<td>255</td>
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<td>446</td>
<td>8.92</td>
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<tr>
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<tr>
<td>620.omnetpp_s</td>
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<td>180</td>
<td>9.07</td>
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<td>12.6</td>
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</tr>
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<td>5.52</td>
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</tr>
<tr>
<td>641.leela_s</td>
<td>56</td>
<td>348</td>
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<tr>
<td>648.exchange2_s</td>
<td>56</td>
<td>203</td>
<td>14.5</td>
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<td>657.xz_s</td>
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</tr>
</tbody>
</table>

SPECspeed®2017_int_base = 10.2
SPECspeed®2017_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
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/lib/ia32:/home/cpu2017/lib/intel64:
/home/cpu2017/je5.0.1-32:/home/cpu2017/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
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SPECspeed®2017_int_base = 10.2
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Jun-2019
Hardware Availability: Apr-2019
Software Availability: Nov-2018

Platform Notes

BIOS Configuration:
Hyper-Threading set to Disabled
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/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on dl380-clx-sles15 Tue Jun 4 00:42:47 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

From /proc/cpuinfo
   model name : Intel(R) Xeon(R) Platinum 8276L CPU @ 2.20GHz
      2 "physical id"s (chips)
      56 "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 : 28
      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 28 29 30
      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):                56
   On-line CPU(s) list:   0-55
   Thread(s) per core:    1
   Core(s) per socket:    28
   Socket(s):             2
   NUMA node(s):          2
   Vendor ID:             GenuineIntel
   CPU family:            6
   Model:                 85
   Model name:            Intel(R) Xeon(R) Platinum 8276L CPU @ 2.20GHz

(Continued on next page)
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Platform Notes (Continued)

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
NUMA node1 CPU(s): 28-55
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 sse3
sdhg fma cx16 xtpm pdcm pclid dca sse4_1 sse4_2 x2apic movbe popcnt
tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault
eb cat_13 cdp_l3 invpcid_single intel_pinn mba tpr_shadow vnmi flexpriority ept
vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erts invpcid rtm cqm mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local
ibpb ibrs stibp dtherm ida arat pin pts pkup osptk avx512_vnni arch_capabilities ssbd

/proc/cpuinfo cache data
cache size : 39424 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
available: 2 nodes (0-1)
node 0 cpus: 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
node 0 size: 386551 MB
node 0 free: 385870 MB
node 1 cpus: 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
53 54 55
node 1 size: 386869 MB
node 1 free: 386589 MB
node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 791982748 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
os-release:

(Continued on next page)
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Platform Notes (Continued)

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 dl380-clx-sles15 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 4 00:41

SPEC is set to: /home/cpu2017
   Filesystem    Type    Size  Used Avail Use% Mounted on
   /dev/sda3      btrfs  407G  105G  302G  26%   /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 U30 04/18/2019
   Memory:
      24x UNKNOW NOT AVAILABLE 32 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) |
|         | 625.x264_s(base) 657.xz_s(base) |
==============================================================================

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

(Continued on next page)
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**Test Sponsor:** HPE  
**Tested by:** HPE

### Compiler Version Notes (Continued)

```plaintext
==============================================================================
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 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 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 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
==============================================================================
```

### Base Compiler Invocation

**C benchmarks:**  
```bash
icc -m64 -std=c11
```

**C++ benchmarks:**  
```bash
icpc -m64
```

**Fortran benchmarks:**  
```bash
ifort -m64
```

### Base Portability Flags

```plaintext
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  
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  
-ipo -O3 -no-prec-div  
-L/usr/local/je5.0.1-64/lib -ljemalloc

**C++ benchmarks:**  
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-ipo -O3 -no-prec-div  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64  
-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  
-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-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-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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