## SPEC® CPU2017 Integer Speed Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL380 Gen10  
(2.20 GHz, Intel Xeon Platinum 8276)

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<th>CPU2017 License: 3</th>
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<td>Software Availability: Nov-2018</td>
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<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_int_base = 10.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td>7.00</td>
<td></td>
</tr>
<tr>
<td>9.00</td>
<td></td>
</tr>
<tr>
<td>11.0</td>
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</tr>
<tr>
<td>13.0</td>
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</tr>
<tr>
<td>15.0</td>
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<tr>
<td>17.0</td>
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</tr>
<tr>
<td>19.0</td>
<td></td>
</tr>
<tr>
<td>21.0</td>
<td></td>
</tr>
<tr>
<td>24.0</td>
<td></td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Platinum 8276
- **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:** 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)
- **Storage:** 1 x 480 GB SATA SSD, RAID 0
- **Other:** None

### Software

- **OS:** SUSE Linux Enterprise Server 15 (x86_64)
- **Kernel:** 4.12.14-23-default
- **Compiler:** C/C++: Version 19.0.1.144 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 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
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SPECspeed2017_int_base = 10.3
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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</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
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<td>256</td>
<td>6.92</td>
<td>256</td>
<td>6.94</td>
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<tr>
<td>602.gcc_s</td>
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<td>411</td>
<td>9.68</td>
<td>416</td>
<td>9.57</td>
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<tr>
<td>605.mcf_s</td>
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<td>12.8</td>
<td>375</td>
<td>12.6</td>
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<tr>
<td>620.omnetpp_s</td>
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<td>9.31</td>
<td>173</td>
<td>9.41</td>
<td>180</td>
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</tr>
<tr>
<td>623.xalancbmk_s</td>
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<td>113</td>
<td>12.5</td>
<td>114</td>
<td>12.4</td>
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<tr>
<td>625.x264_s</td>
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<td>120</td>
<td>14.7</td>
<td>120</td>
<td>14.7</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
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<td>5.52</td>
<td>259</td>
<td>5.53</td>
<td>259</td>
<td>5.54</td>
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<tr>
<td>641.leela_s</td>
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<td>348</td>
<td>4.90</td>
</tr>
<tr>
<td>648.exchange2_s</td>
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<td>14.3</td>
<td>203</td>
<td>14.5</td>
<td>204</td>
<td>14.4</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>56</td>
<td>260</td>
<td>23.8</td>
<td>260</td>
<td>23.8</td>
<td>260</td>
<td>23.8</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/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.
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| SPECspeed2017_int_base = | 10.3 |
| SPECspeed2017_int_peak = | Not Run |

**Test Date:** Apr-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-sles15hs Wed Apr 17 08:23:40 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 8276 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 8276 CPU @ 2.20GHz
```

(Continued on next page)
**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_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_pni mca lpc timerperfvpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_pni mca

From /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: 193045 MB
node 0 free: 192468 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: 193303 MB
node 1 free: 193041 MB
node distances:
node 0 1 0: 10 21 1: 21 10
```

From /proc/meminfo

```
MemTotal: 395621064 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

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

```
os-release:
```

(Continued on next page)
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-sles15hs 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 Apr 17 08:21

SPEC is set to: /home/cpu2017
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda3      xfs   476G   69G  408G  15% /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 02/02/2019
Memory:
24x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666

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

CXXC 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.

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:
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
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
-qopt-mem-layout-trans=4 -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=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-Platform-Flags-Intel-V1.2-CLX-revA.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-revA.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 v1.0.5 on 2019-04-17 08:23:39-0400.