### SPEC CPU®2017 Integer Speed Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL380 Gen10  
(2.60 GHz, Intel Xeon Gold 6240)

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS: SUSE Linux Enterprise Server 15 (x86_64)</td>
<td>CPU Name: Intel Xeon Gold 6240</td>
</tr>
<tr>
<td>Compiler: C/C++: Version 19.0.1.144 of Intel C/C++</td>
<td>Max MHz: 3900</td>
</tr>
<tr>
<td>Compiler Build 20181018 for Linux;</td>
<td>Nominal: 2600</td>
</tr>
<tr>
<td>Fortran: Version 19.0.1.144 of Intel Fortran</td>
<td>Enabled: 36 cores, 2 chips</td>
</tr>
<tr>
<td>Compiler Build 20181018 for Linux;</td>
<td>Orderable: 1, 2 chip(s)</td>
</tr>
<tr>
<td>Firmware: HPE BIOS Version U30 02/02/2019 released Apr-2019</td>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
<td>L2: 1 MB I+D on chip per core</td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
<td>L3: 24.75 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Peak Pointers: Not Applicable</td>
<td>Other: None</td>
</tr>
<tr>
<td>Other: jemalloc memory allocator V5.0.1</td>
<td>Power Management: --</td>
</tr>
</tbody>
</table>

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**SPECspeed®2017_int_base = 9.81**  
**SPECspeed®2017_int_peak = Not Run**

**Test Sponsor:** HPE  
**Hardware Availability:** Apr-2019  
**Test Date:** May-2019  
**Software Availability:** Feb-2019

<table>
<thead>
<tr>
<th>600.perlbench_s 36</th>
<th>602.gcc_s 36</th>
<th>605.mcf_s 36</th>
<th>620.omnetpp_s 36</th>
<th>623.xalancbmk_s 36</th>
<th>625.x264_s 36</th>
<th>631.deepsjeng_s 36</th>
<th>641.leela_s 36</th>
<th>648.exchange2_s 36</th>
<th>657.xz_s 36</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.72</td>
<td>9.26</td>
<td>7.72</td>
<td></td>
<td>12.2</td>
<td>14.1</td>
<td>5.41</td>
<td>4.76</td>
<td>14.0</td>
<td>22.2</td>
</tr>
</tbody>
</table>

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**Threads**

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_int_base (9.81)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>9.81</td>
</tr>
<tr>
<td>1</td>
<td>12.4</td>
</tr>
<tr>
<td>2</td>
<td>14.1</td>
</tr>
<tr>
<td>3</td>
<td>14.0</td>
</tr>
<tr>
<td>4</td>
<td>22.2</td>
</tr>
</tbody>
</table>
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

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>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>36</td>
<td>265</td>
<td>6.71</td>
<td>264</td>
<td>6.72</td>
<td>263</td>
<td>6.74</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>36</td>
<td>379</td>
<td>12.4</td>
<td>382</td>
<td>12.3</td>
<td>378</td>
<td>12.5</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>36</td>
<td>209</td>
<td>7.80</td>
<td>211</td>
<td>7.72</td>
<td>229</td>
<td>7.12</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>36</td>
<td>116</td>
<td>12.2</td>
<td>116</td>
<td>12.3</td>
<td>116</td>
<td>12.2</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>36</td>
<td>126</td>
<td>14.0</td>
<td>125</td>
<td>14.1</td>
<td>125</td>
<td>14.1</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>36</td>
<td>265</td>
<td>5.40</td>
<td>265</td>
<td>5.42</td>
<td>265</td>
<td>5.41</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>36</td>
<td>359</td>
<td>4.75</td>
<td>358</td>
<td>4.76</td>
<td>357</td>
<td>4.77</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>36</td>
<td>209</td>
<td>14.1</td>
<td>210</td>
<td>14.0</td>
<td>209</td>
<td>14.0</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>36</td>
<td>278</td>
<td>22.2</td>
<td>278</td>
<td>22.3</td>
<td>278</td>
<td>22.2</td>
</tr>
</tbody>
</table>

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesysten 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
Hewlett Packard Enterprise
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(2.60 GHz, Intel Xeon Gold 6240)

SPECspeed®2017_int_base = 9.81
SPECspeed®2017_int_peak = Not Run

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 Sat May 11 03:53:45 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) Gold 6240 CPU @ 2.60GHz
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 6240 CPU @ 2.60GHz
Stepping: 6
CPU MHz: 2600.000

(Continued on next page)
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CPU2017 License: 3  
Test Sponsor: HPE  
Tested by: HPE

### Platform Notes (Continued)

<table>
<thead>
<tr>
<th>Specification</th>
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<tbody>
<tr>
<td>BogoMIPS:</td>
</tr>
<tr>
<td>Virtualization:</td>
</tr>
<tr>
<td>L1d cache:</td>
</tr>
<tr>
<td>L1i cache:</td>
</tr>
<tr>
<td>L2 cache:</td>
</tr>
<tr>
<td>L3 cache:</td>
</tr>
<tr>
<td>NUMA node0 CPU(s):</td>
</tr>
<tr>
<td>NUMA node1 CPU(s):</td>
</tr>
<tr>
<td>Flags:</td>
</tr>
</tbody>
</table>

```
BogoMIPS: 5200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-17
NUMA node1 CPU(s): 18-35
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dtsc 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 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_patin mba tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2  invpcid rtm cqm mpx rdt_a avx512f avx512dq avx512cd avx512bw avx512v1 xsaves opt xsave xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbms_total cqm_mbms_local ibpb ibrs stibp dtherm ida arat pin pts pkup ospe avx512_vnni arch_capabilities ssbd
```

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

```
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
node 0 size: 386582 MB
node 0 free: 385743 MB
node 1 cpus: 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
node 1 size: 386841 MB
node 1 free: 386432 MB
```

From `/proc/cpuinfo`

```
cache size : 25344 KB
```

From `/proc/meminfo`

```
MemTotal: 791986340 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

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

```
os-release:
NAME="SLES"
VERSION="15"
VERSION_ID="15"
```

(Continued on next page)
Platform Notes (Continued)

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 May 11 03:51

SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 476G 97G 380G 21% /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 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.
===============================================================================
C++     | 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)

(Continued on next page)
SPECCPU®2017 Integer Speed Result

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

**Specspeed®2017_int_base** = 9.81
**Specspeed®2017_int_peak** = Not Run

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**Compiler Version Notes (Continued)**

<table>
<thead>
<tr>
<th>641.leela_s(base)</th>
</tr>
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<tbody>
<tr>
<td>Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018</td>
</tr>
<tr>
<td>Copyright (C) 1985-2018 Intel Corporation. All rights reserved.</td>
</tr>
</tbody>
</table>

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**Fortran** | 648.exchange2_s(base) |
<table>
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<tr>
<th></th>
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</tbody>
</table>

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**Base Compiler Invocation**

C benchmarks:
```bash
ingc -m64 -std=c11
```

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

Fortran benchmarks:
```bash
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.xalancmk_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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SPECSpeed®2017_int_base = 9.81
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<th>CPU2017 License: 3</th>
<th>Test Date:</th>
<th>May-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: HPE</td>
<td>Hardware Availability:</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Tested by: HPE</td>
<td>Software Availability:</td>
<td>Feb-2019</td>
</tr>
</tbody>
</table>

Base Optimization Flags

C benchmarks:
- Wl,z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- qopt-mem-layout-trans=4 -gopenmp -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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Tested with SPEC CPU®2017 v1.0.5 on 2019-05-11 03:53:45-0400.