**SPEC CPU® 2017 Integer Speed Result**

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
**ProLiant DL360 Gen10**  
(2.50 GHz, Intel Xeon Gold 6210U)  

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>3</th>
<th>Test Sponsor:</th>
<th>HPE</th>
<th>Test Date:</th>
<th>Jul-2019</th>
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<tbody>
<tr>
<td>Tested by:</td>
<td>HPE</td>
<td>Hardware Availability:</td>
<td>Jun-2019</td>
<td></td>
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</table>

### CPU2017 Benchmark Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>6.80</td>
<td>Not Run</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>9.44</td>
<td></td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>12.6</td>
<td></td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>8.18</td>
<td></td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>625.x264_s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>641.leela_s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>657.xz_s</td>
<td></td>
<td></td>
</tr>
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</table>

**Threads**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECspeed®2017_int_base</th>
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<tr>
<td></td>
<td>(9.89)</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Gold 6210U  
- **Max MHz:** 3900  
- **Nominal:** 2500  
- **Enabled:** 20 cores, 1 chip, 2 threads/core  
- **Orderable:** 1 chip  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **L2:** 1 MB I+D on chip per core  
- **L3:** 27.5 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 192 GB (12 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 05/21/2019 released Jun-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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CPU2017 License: 3
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Tested by: HPE

Results Table

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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>600:perlbench_s</td>
<td>40</td>
<td>261</td>
<td>6.80</td>
<td>260</td>
<td>6.82</td>
<td>6.78</td>
</tr>
<tr>
<td>602:gcc_s</td>
<td>40</td>
<td>426</td>
<td>9.35</td>
<td>422</td>
<td>9.44</td>
<td>9.44</td>
</tr>
<tr>
<td>605:mcf_s</td>
<td>40</td>
<td>378</td>
<td>12.5</td>
<td>374</td>
<td>12.6</td>
<td>12.6</td>
</tr>
<tr>
<td>620:omnetpp_s</td>
<td>40</td>
<td>199</td>
<td>8.18</td>
<td>200</td>
<td>8.17</td>
<td>8.24</td>
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<tr>
<td>623:xalancbmk_s</td>
<td>40</td>
<td>115</td>
<td>12.3</td>
<td>116</td>
<td>12.2</td>
<td>12.2</td>
</tr>
<tr>
<td>625:x264_s</td>
<td>40</td>
<td>122</td>
<td>14.5</td>
<td>122</td>
<td>14.5</td>
<td>14.5</td>
</tr>
<tr>
<td>631:deepsjeng_s</td>
<td>40</td>
<td>257</td>
<td>5.57</td>
<td>257</td>
<td>5.57</td>
<td>5.59</td>
</tr>
<tr>
<td>641:leela_s</td>
<td>40</td>
<td>361</td>
<td>4.73</td>
<td>362</td>
<td>4.71</td>
<td>4.73</td>
</tr>
<tr>
<td>648:exchange2_s</td>
<td>40</td>
<td>211</td>
<td>13.9</td>
<td>211</td>
<td>13.9</td>
<td>13.9</td>
</tr>
<tr>
<td>657:xz_s</td>
<td>40</td>
<td>295</td>
<td>20.9</td>
<td>296</td>
<td>20.9</td>
<td>20.9</td>
</tr>
</tbody>
</table>

SPECspeed®2017_int_base = 9.89
SPECspeed®2017_int_peak = Not Run

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
## 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

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 6210U CPU @ 2.50GHz
  1 "physical id"s (chips)
  40 "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: 20
  - siblings: 40
  - physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

**From lscpu:**
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 40
- On-line CPU(s) list: 0-39
- Thread(s) per core: 2
- Core(s) per socket: 20
- Socket(s): 1
- NUMA node(s): 1
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 6210U CPU @ 2.50GHz
- Stepping: 7
- CPU MHz: 2500.000
- BogoMIPS: 5000.00
- Virtualization: VT-x

---

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Test Sponsor: HPE
Tested by: HPE

Test Date: Jul-2019
Hardware Availability: Jun-2019
Software Availability: Feb-2019

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**Platform Notes (Continued)**

```
L1d cache:           32K
L1i cache:           32K
L2 cache:            1024K
L3 cache:            28160K
NUMA node0 CPU(s):   0-39
Flags:               fpu vme de pse tsc msr pae 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
                     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
dsclerodeadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault
                     epb cat_l3 cdpq_13 invpcid_single intel_puin mba tpr_shadow vmx f16c
                     movbe popcnt
                     tsc_adjust bm1 hle avx2 smem bmi2 ertp rdtsc ort cqm mpx smep bmi2 etpm sbp
                     avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512vd avx512bw
                     avx512vl xsaveopt xsaves xgetbv1 xsaves cqm_l1c cqm_occip_11c cqm_mbb_total
                     cqm_mbb_rlocal
                     ibpb ibrs stibp dtherm ida arat pln pts pku ospke avx512_vnni arch_capabilities ssbd
```

```
/cache data
   cache size : 28160 KB
```

```
From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
   physical chip.
a vailable: 1 node (0)
   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
   28 29 30 31 32 33 34 35 36 37 38 39
   node 0 size: 193084 MB
   node 0 free: 192385 MB
   node distances:
   node 0
   0: 10
```

```
From /proc/meminfo
MemTotal:        197718948 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

```
From /etc/*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"
```

(Continued on next page)
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Platform Notes (Continued)

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 Jul 3 18:10

SPEC is set to: /home/cpu2017_u2

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda1      xfs   373G  134G  239G  36% /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 05/21/2019
 Memory:
  12x UNKNOWN NOT AVAILABLE
  12x 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)
        | 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.
SPECCPU®2017 Integer Speed Result

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Test Date: Jul-2019
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Software Availability: Feb-2019

Compiler Version Notes (Continued)

==============================================================================
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
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:
-Wl,-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

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Base Optimization Flags (Continued)

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-Lo/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-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
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2019-04-03.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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