**SPEC® CPU2017 Integer Speed Result**

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

**ProLiant DL560 Gen10**
*(2.60 GHz, Intel Xeon Gold 6240)*

**SPECspeed2017_int_base = 9.81**

**SPECspeed2017_int_peak = Not Run**

### Hardware

- **CPU Name:** Intel Xeon Gold 6240
- **Max MHz.:** 3900
- **Nominal:** 2600
- **Enabled:** 72 cores, 4 chips
- **Orderable:** 1, 2, 4 chip(s)
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 1 MB I+D on chip per core
- **L3:** 24.75 MB I+D on chip per chip
- **Other:** None
- **Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)
- **Storage:** 1 x 480 GB SATA SSD, RAID 0

### 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 U34 02/02/2019 released Apr-2019
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** jemalloc memory allocator V5.0.1

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_int_base (9.81)</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>72</td>
<td>0.80</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>72</td>
<td>9.01</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>72</td>
<td>12.0</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>72</td>
<td>7.76</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>72</td>
<td>12.3</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>72</td>
<td>14.1</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>72</td>
<td>5.39</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>72</td>
<td>4.75</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>72</td>
<td>14.0</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>72</td>
<td>23.2</td>
</tr>
</tbody>
</table>

**Test Sponsor:** Hewlett Packard Enterprise  
**Hardware Availability:** Apr-2019  
**Software Availability:** Feb-2019
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(Test Sponsor: HPE)  
ProLiant DL560 Gen10  
(2.60 GHz, Intel Xeon Gold 6240)

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<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>72</td>
<td>262</td>
<td>6.78</td>
<td><strong>261</strong></td>
<td><strong>6.80</strong></td>
<td>261</td>
<td>6.81</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>72</td>
<td><strong>442</strong></td>
<td>9.01</td>
<td>440</td>
<td>9.06</td>
<td>451</td>
<td>8.83</td>
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<tr>
<td>605.mcf_s</td>
<td>72</td>
<td>388</td>
<td>12.2</td>
<td>393</td>
<td>12.0</td>
<td><strong>392</strong></td>
<td><strong>12.0</strong></td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>72</td>
<td><strong>210</strong></td>
<td>7.76</td>
<td>218</td>
<td>7.48</td>
<td>203</td>
<td>8.03</td>
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<td>623.xalancbmk_s</td>
<td>72</td>
<td>115</td>
<td>12.3</td>
<td><strong>116</strong></td>
<td><strong>12.3</strong></td>
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<td>12.1</td>
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<tr>
<td>625.x264_s</td>
<td>72</td>
<td>125</td>
<td>14.1</td>
<td><strong>125</strong></td>
<td><strong>14.1</strong></td>
<td>125</td>
<td>14.1</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>72</td>
<td>266</td>
<td>5.38</td>
<td>266</td>
<td>5.39</td>
<td><strong>266</strong></td>
<td><strong>5.39</strong></td>
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<tr>
<td>641.leela_s</td>
<td>72</td>
<td><strong>359</strong></td>
<td><strong>4.75</strong></td>
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<td>4.76</td>
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<td>72</td>
<td>209</td>
<td>14.0</td>
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<td>23.3</td>
<td><strong>266</strong></td>
<td><strong>23.2</strong></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.
Hewlett Packard Enterprise
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ProLiant DL560 Gen10
(2.60 GHz, Intel Xeon Gold 6240)

SPECspeed2017_int_base = 9.81
SPECspeed2017_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
Advanced Memory Protection set to Advanced ECC
Sysinfo program /home/cpu2017_u2/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcede8f2999c33d61f64985e45859ea9
running on linux-vqdi Thu Apr 18 06:15:18 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
  4 "physical id"s (chips)
  72 "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
physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 3: 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):             72
On-line CPU(s) list: 0-71
Thread(s) per core: 1
Core(s) per socket: 18
Socket(s):          4
NUMA node(s):       4
Vendor ID:          GenuineIntel
CPU family:         6
Model:              85

(Continued on next page)
Platform Notes (Continued)

Model name:    Intel(R) Xeon(R) Gold 6240 CPU @ 2.60GHz
Stepping:      6
CPU MHz:       2600.000
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
NUMA node2 CPU(s):  36-53
NUMA node3 CPU(s):  54-71
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
dmb fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt
sexd tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault
epb cat_13 cdp l3 invpcid_single intel_pti mda tpr_shadow vnmi flexpriority ept
vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3ms 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_mbm_total cqm_mbm_local
ibpb ibrs stibp dtherm ida arat pln pts pkp ospke avx512_vnni arch_capabilities ssbd

/platform/cputinfo cache data
  cache size: 25344 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
  available: 4 nodes (0-3)
  node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
  node 0 size: 193117 MB
  node 0 free: 192703 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: 193532 MB
  node 1 free: 193174 MB
  node 2 cpus: 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
  node 2 size: 193532 MB
  node 2 free: 193366 MB
  node 3 cpus: 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71
  node 3 size: 193502 MB
  node 3 free: 193338 MB
  node distances:
    node 0 1 2 3
      0: 10 21 21 21
      1: 21 10 21 21

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Platform Notes (Continued)

2: 21 21 10 21
3: 21 21 21 10

From /proc/meminfo
MemTotal: 792253020 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-vqdi 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 18 06:14

SPEC is set to: /home/cpu2017_u2
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 btrfs 371G 336G 35G 91% /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 U34 02/02/2019
Memory:
24x UNKNOWN NOT AVAILABLE
24x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2933

(End of data from sysinfo program)
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Compiler Version Notes

==============================================================================
CC  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.
==============================================================================
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 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
==============================================================================
FC  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

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

Test Date: Apr-2019
Hardware Availability: Apr-2019
Software Availability: Feb-2019

Base Portability Flags (Continued)

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

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/Intel-ic18.0-official-linux64.2019-04-03.xml
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 20:45:17-0400.