### SPEC® CPU2017 Integer Speed Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL580 Gen10  
(2.10 GHz, Intel Xeon Gold 6238M)

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base</th>
<th>9.54</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

#### Hardware

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Gold 6238M</td>
</tr>
<tr>
<td>Max MHz.</td>
<td>3700</td>
</tr>
<tr>
<td>Nominal</td>
<td>2100</td>
</tr>
<tr>
<td>Enabled</td>
<td>88 cores, 4 chips</td>
</tr>
<tr>
<td>Orderable</td>
<td>1, 2, 3, 4 chip(s)</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3</td>
<td>30.25 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>768 GB (24 x 32 GB 2Rx4 PC4-2666V-R)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x 400 GB SAS SSD, RAID 0</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>

#### Software

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 15 (x86_64)</td>
</tr>
<tr>
<td>Kernel</td>
<td>4.12.14-23-default</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/C++: Version 19.0.2.187 of Intel C/C++</td>
</tr>
<tr>
<td></td>
<td>Compiler Build 20190117 for Linux; Fortran: Version 19.0.2.187 of Intel Fortran</td>
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<td></td>
<td>Compiler Build 20190117 for Linux</td>
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<tr>
<td>Parallel</td>
<td>Yes</td>
</tr>
<tr>
<td>Firmware</td>
<td>HPE BIOS Version U34 05/21/2019 released Apr-2019</td>
</tr>
<tr>
<td>File System</td>
<td>xfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Other</td>
<td>jemalloc memory allocator V5.0.1</td>
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### Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_int_base (9.54)</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_s</td>
<td>88</td>
<td>6.45</td>
</tr>
<tr>
<td>gcc_s</td>
<td>88</td>
<td>8.82</td>
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<tr>
<td>mcf_s</td>
<td>88</td>
<td>11.8</td>
</tr>
<tr>
<td>omnetpp_s</td>
<td>88</td>
<td>8.27</td>
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<tr>
<td>xalancbmk_s</td>
<td>88</td>
<td>11.7</td>
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<tr>
<td>x264_s</td>
<td>88</td>
<td>13.8</td>
</tr>
<tr>
<td>deepsjeng_s</td>
<td>88</td>
<td>5.15</td>
</tr>
<tr>
<td>leela_s</td>
<td>88</td>
<td>4.51</td>
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<tr>
<td>exchange2_s</td>
<td>88</td>
<td>13.3</td>
</tr>
<tr>
<td>xz_s</td>
<td>88</td>
<td>22.6</td>
</tr>
</tbody>
</table>

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Standard Performance Evaluation Corporation (info@spec.org)  
https://www.spec.org/
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Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL580 Gen10
(2.10 GHz, Intel Xeon Gold 6238M)

SPECspeed2017_int_base = 9.54
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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<th>Seconds</th>
<th>Ratio</th>
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<tr>
<td>600.perlbench_s</td>
<td>88</td>
<td>274</td>
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<td>602.gcc_s</td>
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<td>631.deepsjeng_s</td>
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<td>4.51</td>
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<td>13.2</td>
<td>221</td>
<td>13.3</td>
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<tr>
<td>657.xz_s</td>
<td>88</td>
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<td>22.6</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></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.
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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| SPECspeed2017_int_base = 9.54 |
| SPECspeed2017_int_peak = Not Run |

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

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

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_u2/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcede8f2999c33d61f64985e45859ea9
running on linux-sypg Sat Aug 18 11:39:26 2018

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 6238M CPU @ 2.10GHz
4  "physical id"s (chips)
88 "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 : 22
siblings : 22
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
```

From lscpu:

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 88
On-line CPU(s) list: 0-87
Thread(s) per core: 1
Core(s) per socket: 22
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6238M CPU @ 2.10GHz
```

(Continued on next page)
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Platform Notes (Continued)

Stepping: 7
CPU MHz: 2100.000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 30976K
NUMA node0 CPU(s): 0-21
NUMA node1 CPU(s): 22-43
NUMA node2 CPU(s): 44-65
NUMA node3 CPU(s): 66-87

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 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 xtrm 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
mba tpr_shadow vnmi flexpriority ept
vmid fs.gsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms
invpcid rtm cmq mpx rdt_a avx512f avx512dq rdseed adx
smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xlsxaveopt xsaveopt xgetbv1 xsaves cmq_llc cqm_occup_llc
cmq_mbm_total cqm_mbm_local
ibpb stibp dtherm ida arat pln pts pku ospke
avx512_vnni arch_capabilities ssbd

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 18 19 20 21
node 0 size: 193116 MB
node 0 free: 192610 MB
node 1 cpus: 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43
node 1 size: 193531 MB
node 1 free: 193346 MB
node 2 cpus: 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65
node 2 size: 193502 MB
node 2 free: 193078 MB
node 3 cpus: 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87
node 3 size: 193530 MB
node 3 free: 193347 MB
node distances:
node 0 1 2 3
0: 10 21 21 21
1: 21 10 21 21
2: 21 21 10 21

(Continued on next page)
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Test Date: Jun-2019
Hardware Availability: Apr-2019
Software Availability: Feb-2019

Platform Notes (Continued)

3: 21 21 21 10

From /proc/meminfo
MemTotal: 792249988 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-sypg 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 Aug 18 11:37

SPEC is set to: /home/cpu2017_u2

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda1 xfs 894G 78G 816G 9% /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 05/21/2019
Memory:
24x UNKNOWN NOT AVAILABLE
24x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2666

(End of data from sysinfo program)
Hewlett Packard Enterprise  
(Test Sponsor: HPE)
ProLiant DL580 Gen10  
(2.10 GHz, Intel Xeon Gold 6238M)

SPECSpeed2017_int_base = 9.54
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Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Base Portability Flags

600.perlb ench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64

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.xalanchmk_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.
------------------------------------------------------------------------------
(Continued on next page)
<table>
<thead>
<tr>
<th>Base Portability Flags (Continued)</th>
</tr>
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<tbody>
<tr>
<td>623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX</td>
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<tr>
<td>625.x264_s: -DSPEC_LP64</td>
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<tr>
<td>631.deepsjeng_s: -DSPEC_LP64</td>
</tr>
<tr>
<td>641.leela_s: -DSPEC_LP64</td>
</tr>
<tr>
<td>648.exchange2_s: -DSPEC_LP64</td>
</tr>
<tr>
<td>657.xz_s: -DSPEC_LP64</td>
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<table>
<thead>
<tr>
<th>Base Optimization Flags</th>
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<tbody>
<tr>
<td>C benchmarks:</td>
</tr>
<tr>
<td>-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div</td>
</tr>
<tr>
<td>-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP</td>
</tr>
<tr>
<td>-L/home/cpu2017_u2/je5.0.1-64/ -ljemalloc</td>
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<table>
<thead>
<tr>
<th>C++ benchmarks:</th>
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<tbody>
<tr>
<td>-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div</td>
</tr>
<tr>
<td>-qopt-mem-layout-trans=4</td>
</tr>
<tr>
<td>-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64</td>
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<tr>
<td>-lqkmalloc</td>
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<table>
<thead>
<tr>
<th>Fortran benchmarks:</th>
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<tbody>
<tr>
<td>-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4</td>
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<tr>
<td>-nostandard-realloc-lhs</td>
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</table>

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/HPE-ic19.0u1-flags-linux64.html
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-ic19.0u1-flags-linux64.xml
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.

Tested with SPEC CPU2017 v1.0.5 on 2018-08-18 11:39:26-0400.