### CPU2017 Integer Speed Result

**Hewlett Packard Enterprise**  
(2.10 GHz, Intel Xeon Gold 6238)

<table>
<thead>
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<th>CPU2017 License: 3</th>
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<tr>
<td>Tested by: HPE</td>
<td>Test Date: May-2019</td>
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<tr>
<td></td>
<td>Hardware Availability: Apr-2019</td>
</tr>
<tr>
<td></td>
<td>Software Availability: Feb-2019</td>
</tr>
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</table>

#### SPECspeed2017_int_base = 9.55

#### SPECspeed2017_int_peak = Not Run

---

**Hardware**

- **CPU Name:** Intel Xeon Gold 6238
- **Max MHz.:** 3700
- **Nominal:** 2100
- **Enabled:** 44 cores, 2 chips
- **Orderable:** 1, 2 chip(s)
- **Cache L1:** 32 KB I+D on chip per core
- **L2:** 32 KB D on chip per core
- **L3:** 30.25 MB I+D on chip per chip
- **Other:** None
- **Memory:** 384 GB (24 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 I42 02/02/2019 released Apr-2019
- **File System:** btrfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** jemalloc memory allocator V5.0.1
**SPEC CPU2017 Integer Speed Result**

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)
Synergy 480 Gen10
(2.10 GHz, Intel Xeon Gold 6238)

**SPECspeed2017_int_base = 9.55**

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**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>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>44</td>
<td>274</td>
<td>6.47</td>
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<td>6.48</td>
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<tr>
<td>602.gcc_s</td>
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<td>436</td>
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<td>440</td>
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<td>605.mcf_s</td>
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<td>392</td>
<td>12.0</td>
<td>390</td>
<td>12.1</td>
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<tr>
<td>620.omnetpp_s</td>
<td>44</td>
<td>197</td>
<td>8.30</td>
<td>198</td>
<td>8.22</td>
<td>199</td>
<td>8.18</td>
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<tr>
<td>623.xalancbmk_s</td>
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<td>11.6</td>
<td>122</td>
<td>11.6</td>
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<tr>
<td>625.x264_s</td>
<td>44</td>
<td>128</td>
<td>13.8</td>
<td>128</td>
<td>13.8</td>
<td>128</td>
<td>13.8</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>44</td>
<td>276</td>
<td>5.20</td>
<td>276</td>
<td>5.20</td>
<td>276</td>
<td>5.20</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>44</td>
<td>379</td>
<td>4.50</td>
<td>379</td>
<td>4.50</td>
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<td>4.50</td>
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<tr>
<td>648.exchange2_s</td>
<td>44</td>
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<td>221</td>
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<td>13.3</td>
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<tr>
<td>657.xz_s</td>
<td>44</td>
<td>284</td>
<td>21.8</td>
<td>284</td>
<td>21.8</td>
<td>284</td>
<td>21.8</td>
</tr>
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**SPECspeed2017_int_base = 9.55**

**SPECspeed2017_int_peak = Not Run**

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"`
- `OMP_STACKSIZE = "192M"`

Binaries compiled on a system with 1x Intel Core i9–7900X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
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`

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

(Continued on next page)
General Notes (Continued)


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 9bcde8f2999c33d61f64985e45859ea9
running on sy480g10-2 Tue May 28 13:04:33 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 6238 CPU @ 2.10GHz
  2 "physical id"s (chips)
  44 "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

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 44
On-line CPU(s) list: 0-43
Thread(s) per core: 1
Core(s) per socket: 22
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel

(Continued on next page)
### SPEC CPU2017 Integer Speed Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
**Synergy 480 Gen10**  
(2.10 GHz, Intel Xeon Gold 6238)

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

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**Platform Notes (Continued)**

- **CPU family:** 6  
- **Model:** 85  
- **Model name:** Intel(R) Xeon(R) Gold 6238 CPU @ 2.10GHz  
- **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  
- **Flags:** fpu vme de pse tsc msr pae mce cmov  
  pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtsscp  
  lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid  
  aperf perfctr tscknown_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_ppin mba tpr_shadow vmx flexpriority ept  
  vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2  
  erms invpcid rtm cqm mpx rdtpcsrf  
  avx512f avx512dq rdseed adx smepclflushopt clwb intel_pt avx512cd avx512bw avx512vl  
  xsaveopt xsavec xsaveopt xGetsv1 xsavec cqm_llc cqm_occupancy cqm_total cqm_mbm_local  
  ibpb ibrs stibp dtherm ida arat pml pts psu ospke avx512_vnni arch_capabilities ssbd

From /proc/cpuinfo cache data  
   cache size : 30976 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  
   node 0 size: 193017 MB  
   node 0 free: 192370 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: 193333 MB  
   node 1 free: 193152 MB  
   node distances:  
   node 0 1  
   0: 10 21  
   1: 21 10

From /proc/meminfo  
   MemTotal: 395623288 kB  
   HugePages_Total: 0  
   Hugepagesize: 2048 kB

(Continued on next page)
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**Platform Notes (Continued)**

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 sy480g10-2 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 28 13:02
```

SPEC is set to: /home/cpu2017_u2

```
  Filesystem  Type      Size  Used Avail Use% Mounted on
  /dev/sdb2   btrfs      371G   91G  280G  25%  /home
```

(End of data from sysinfo program)

**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

(Continued on next page)
SPECCPU2017 Integer Speed Result

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

Compiler Version Notes (Continued)

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.mcfs: -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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(Test Sponsor: HPE)
Synergy 480 Gen10
(2.10 GHz, Intel Xeon Gold 6238)

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SPECspeed2017_int_peak = Not Run

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-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 2019-05-28 14:04:33-0400.