### SPEC CPU®2017 Integer Speed Result

#### Copyright 2017-2020 Standard Performance Evaluation Corporation

### Hewlett Packard Enterprise

**Test Sponsor:** HPE  
**ProLiant DL380 Gen10**  
(3.40 GHz, Intel Xeon Gold 6246R)

#### SPECspeed®2017_int_base = 10.3

#### SPECspeed®2017_int_peak = 10.4

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsors</td>
<td>HPE</td>
</tr>
<tr>
<td>Tested by</td>
<td>HPE</td>
</tr>
<tr>
<td>Test Date</td>
<td>Feb-2020</td>
</tr>
<tr>
<td>Hardware Availability</td>
<td>Feb-2020</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Jun-2019</td>
</tr>
</tbody>
</table>

#### Hardware

**CPU Name:** Intel Xeon Gold 6246R  
**Max MHz:** 4100  
**Nominal:** 3400  
**Enabled:** 32 cores, 2 chips  
**Orderable:** 1, 2 chip(s)  
**Cache L1:** 32 KB I + 32 KB D on chip per core  
**Cache L2:** 1 MB I+D on chip per core  
**Cache L3:** 35.75 MB I+D on chip per chip  
**Other:** None  
**Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)  
**Storage:** 1 x 400 GB SAS SSD  
**Other:** None

#### Software

**OS:** SUSE Linux Enterprise Server 15 SP1 (x86_64)  
**Kernel:** 4.12.14-195-default  
**Compiler:** C/C++: Version 19.0.4.227 of Intel C/C++  
**Compiler Build:** 20190416 for Linux;  
**Fortran:** Version 19.0.4.227 of Intel Fortran  
**Compiler Build:** 20190416 for Linux  
**Parallel:** Yes  
**Firmware:** HPE BIOS Version U30 2.22 (11/13/2019) released Feb-2020  
**File System:** btrfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 64-bit  
**Other:** jemalloc memory allocator V5.0.1  
**Power Management:** BIOS set to prefer performance at the cost of additional power usage

#### Threads

<table>
<thead>
<tr>
<th>Application</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_s</td>
<td>32</td>
<td>6.77</td>
<td>8.43</td>
</tr>
<tr>
<td>gcc_s</td>
<td>32</td>
<td>9.18</td>
<td>10.4</td>
</tr>
<tr>
<td>mcf_s</td>
<td>32</td>
<td>9.31</td>
<td>10.3</td>
</tr>
<tr>
<td>omnetpp_s</td>
<td>32</td>
<td>9.15</td>
<td>9.92</td>
</tr>
<tr>
<td>xalancbmk_s</td>
<td>32</td>
<td>12.5</td>
<td>14.6</td>
</tr>
<tr>
<td>x264_s</td>
<td>32</td>
<td>14.6</td>
<td>15.0</td>
</tr>
<tr>
<td>deepsjeng_s</td>
<td>32</td>
<td>5.60</td>
<td>5.79</td>
</tr>
<tr>
<td>leela_s</td>
<td>32</td>
<td>4.80</td>
<td>4.79</td>
</tr>
<tr>
<td>exchange2_s</td>
<td>32</td>
<td>16.3</td>
<td>16.4</td>
</tr>
<tr>
<td>xz_s</td>
<td>32</td>
<td>23.2</td>
<td>23.2</td>
</tr>
</tbody>
</table>

**SPECspeed®2017_int_base (10.3)**  
**SPECspeed®2017_int_peak (10.4)**
## SPEC CPU®2017 Integer Speed Result

### Hewlett Packard Enterprise

- **Test Sponsor:** HPE
- **ProLiant DL380 Gen10**
- **CPU:** (3.40 GHz, Intel Xeon Gold 6246R)

### SPECspeed®2017_int_base = 10.3

### SPECspeed®2017_int_peak = 10.4

### 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>
<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>32</td>
<td>262</td>
<td>6.77</td>
<td>261</td>
<td>6.79</td>
<td>262</td>
<td>6.77</td>
<td>32</td>
<td>230</td>
<td>7.70</td>
<td>229</td>
<td>7.75</td>
<td>229</td>
<td>7.76</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>32</td>
<td>384</td>
<td>12.3</td>
<td>385</td>
<td>12.3</td>
<td>388</td>
<td>12.2</td>
<td>32</td>
<td>388</td>
<td>12.2</td>
<td>378</td>
<td>12.5</td>
<td>380</td>
<td>12.4</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>32</td>
<td>176</td>
<td>9.24</td>
<td>175</td>
<td>9.34</td>
<td>175</td>
<td>9.31</td>
<td>32</td>
<td>180</td>
<td>9.08</td>
<td>175</td>
<td>9.32</td>
<td>178</td>
<td>9.15</td>
</tr>
<tr>
<td>623.xalanchmk_s</td>
<td>32</td>
<td>113</td>
<td>12.5</td>
<td>114</td>
<td>12.4</td>
<td>113</td>
<td>12.5</td>
<td>32</td>
<td>114</td>
<td>12.4</td>
<td>114</td>
<td>12.5</td>
<td>114</td>
<td>12.4</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>32</td>
<td>121</td>
<td>14.6</td>
<td>121</td>
<td>14.6</td>
<td>121</td>
<td>14.6</td>
<td>32</td>
<td>121</td>
<td>14.5</td>
<td>121</td>
<td>14.5</td>
<td>121</td>
<td>14.6</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>32</td>
<td>256</td>
<td>5.60</td>
<td>256</td>
<td>5.60</td>
<td>256</td>
<td>5.60</td>
<td>32</td>
<td>256</td>
<td>5.59</td>
<td>256</td>
<td>5.60</td>
<td>256</td>
<td>5.59</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>32</td>
<td>179</td>
<td>16.4</td>
<td>180</td>
<td>16.3</td>
<td>181</td>
<td>16.2</td>
<td>32</td>
<td>179</td>
<td>16.4</td>
<td>179</td>
<td>16.4</td>
<td>181</td>
<td>16.2</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>32</td>
<td>267</td>
<td>23.2</td>
<td>267</td>
<td>23.2</td>
<td>266</td>
<td>23.3</td>
<td>32</td>
<td>267</td>
<td>23.1</td>
<td>266</td>
<td>23.2</td>
<td>266</td>
<td>23.2</td>
</tr>
</tbody>
</table>

**SPECspeed®2017_int_base = 10.3**

**SPECspeed®2017_int_peak = 10.4**

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:
  ```bash
  sync; echo 3 > /proc/sys/vm/drop_caches
  ```

### Environment Variables Notes

Environment variables set by runcpu before the start of the run:
- `KMP_AFFINITY = "granularity=fine,compact"
- `LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
- `OMP_STACKSIZE = "192M"

### General Notes

- 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.

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10
(3.40 GHz, Intel Xeon Gold 6246R)

**SPEC CPU®2017 Integer Speed Result**

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>10.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_int_peak</td>
<td>10.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>HPE</td>
</tr>
<tr>
<td>Tested by:</td>
<td>HPE</td>
</tr>
<tr>
<td>Test Date:</td>
<td>Feb-2020</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Feb-2020</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Jun-2019</td>
</tr>
</tbody>
</table>

**General Notes (Continued)**

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:
- 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
- Energy/Performance Bias set to Balanced Power
- Minimum Processor Idle Power Core C-State set to C1E State
- Numa Group Size Optimization set to Flat

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edh1be6e46a485a0011
running on linux-3rlx Mon Feb 10 21:41:57 2020

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 6246R CPU @ 3.40GHz
- 2 "physical id"'s (chips)
- 32 "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: 16
  - siblings: 16
  - physical 0: cores 0 1 2 3 5 6 9 11 12 16 18 19 20 26 28 29
  - physical 1: cores 1 2 3 6 9 12 13 16 17 18 19 22 26 27 28 29

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- Address sizes: 46 bits physical, 48 bits virtual
- CPU(s): 32
- On-line CPU(s) list: 0-31
- Thread(s) per core: 1
- Core(s) per socket: 16

(Continued on next page)
Hewlett Packard Enterprise
ProLiant DL380 Gen10
(3.40 GHz, Intel Xeon Gold 6246R)

**SPEC CPU®2017 Integer Speed Result**

Copyright 2017-2020 Standard Performance Evaluation Corporation

**Test Sponsor:** HPE

**Hardware Availability:** Feb-2020

**Software Availability:** Jun-2019

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Hardware Availability:** Feb-2020

**Tested by:** HPE

**Software Availability:** Jun-2019

---

**Platform Notes (Continued)**

- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 6246R CPU @ 3.40GHz
- Stepping: 7
- CPU MHz: 3400.000
- BogoMIPS: 6800.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 36608K
- NUMA node0 CPU(s): 0-15
- NUMA node1 CPU(s): 16-31
- Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
- socket(s): clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
- constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
- aperfmperf pni pclmulqdq dtes64monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
- xtruncdcm pdcm cdc dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
- xsave avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3
- invpcid_single intel_ppa ssbd mba ibrs ibrd ibrs_enhanced tpr_shadow vnmi
- flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ets invpcid rtm
- cqm mpx rdt_a avx512f avx512dq rdseed adx clflushopt clwb intel_pt avx512cd
- avx512bw avx512vl xsaves xsaveopt xsaves ecx xgetbv1 xsaves cqm_llc cqm_mmb_numa
- cqm_mbb_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_l1d
- arch_capabilities

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
- node 0 size: 193127 MB
- node 0 free: 190674 MB
- node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
- node 1 size: 193502 MB
- node 1 free: 193279 MB
- node distances:

- node 0 1
- 0: 10 21
- 1: 21 10

From /proc/meminfo

(Continued on next page)
Platform Notes (Continued)

MemTotal: 395909228 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
    os-release:
      NAME="SLES"
      VERSION="15-SP1"
      VERSION_ID="15.1"
      PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
      ID="sles"
      ID_LIKE="suse"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:15:sp1"

uname -a:
    Linux linux-3rlx 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 3 Feb 10 21:39

SPEC is set to: /home/cpu2017
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/sda2 btrfs 369G 101G 268G 28% /home

From /sys/devices/virtual/dmi/id
    BIOS: HPE U30 11/13/2019
    Vendor: HPE
    Product: ProLiant DL380 Gen10
    Product Family: ProLiant
    Serial: 2M294204YV

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.

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10
(3.40 GHz, Intel Xeon Gold 6246R)

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

Platform Notes (Continued)

Memory:
12x UNKNOWN NOT AVAILABLE
12x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

C
600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(base, peak)

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

C++
620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Fortran
648.exchange2_s(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
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
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10
(3.40 GHz, Intel Xeon Gold 6246R)

SPECspeed®2017_int_base = 10.3
SPECspeed®2017_int_peak = 10.4

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

Test Date: Feb-2020
Hardware Availability: Feb-2020
Software Availability: Jun-2019

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/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_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

Fortran benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL380 Gen10  
(3.40 GHz, Intel Xeon Gold 6246R)  

| SPECspeed®2017_int_base = 10.3 |
| SPECspeed®2017_int_peak = 10.4 |

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

**Test Date**: Feb-2020  
**Hardware Availability**: Feb-2020  
**Software Availability**: Jun-2019

---

**Peak Portability Flags**

Same as Base Portability Flags

---

**Peak Optimization Flags**

**C benchmarks**:

600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2  
-xCORE-AVX512 -qopt-mem-layout-trans=4 -ipo -O3  
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp  
-DSPEC_OPENMP -fno-strict-overflow  
-L/usr/local/jemalloc  

602.gcc_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2  
-xCORE-AVX512 -qopt-mem-layout-trans=4 -ipo -O3  
-no-prec-div -DSPEC_SUPPRESS_OPENMP  
-L/usr/local/jemalloc  

605.mcf_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4  
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP  
-L/usr/local/jemalloc  

625.x264_s: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_SUPPRESS_OPENMP  
-L/usr/local/jemalloc  

657.xz_s: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_SUPPRESS_OPENMP  
-L/usr/local/jemalloc  

**C++ benchmarks**:

620.omnetpp_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4  
-DSPEC_SUPPRESS_OPENMP  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64  

623.xalancbmk_s: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64  

(Continued on next page)
Peak Optimization Flags (Continued)

631.deepsjeng_s: Same as 623.xalancbmk_s

641.leela_s: Same as 623.xalancbmk_s

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