**SPEC® CPU2017 Integer Speed Result**

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant BL460c Gen10  
(2.30 GHz, Intel Xeon Gold 5218)  

<table>
<thead>
<tr>
<th>Software Availability:</th>
<th>SPECspeed2017_int_peak = Not Run</th>
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<tbody>
<tr>
<td>CPU2017 License:</td>
<td>3</td>
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<td>Apr-2019</td>
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### Threads

<table>
<thead>
<tr>
<th>Specification</th>
<th>Threads</th>
<th>SPECspeed2017_int_base (9.54)</th>
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</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>32</td>
<td>6.79</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>32</td>
<td>9.35</td>
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<tr>
<td>605.mcf_s</td>
<td>32</td>
<td>12.04</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>32</td>
<td>7.38</td>
</tr>
<tr>
<td>623.xalanchmk_s</td>
<td>32</td>
<td>12.2</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>32</td>
<td>12.2</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>32</td>
<td>5.42</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>32</td>
<td>4.75</td>
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<tr>
<td>648.exchange2_s</td>
<td>32</td>
<td>14.0</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>32</td>
<td>21.0</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Gold 5218  
- **Max MHz.:** 3900  
- **Nominal:** 2300  
- **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:** 22 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2666V-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 I41 02/02/2019 released Apr-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
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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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<tr>
<td>600.perlbench_s</td>
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<td>426</td>
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<td>12.4</td>
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<tr>
<td>625.x264_s</td>
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<td>11.6</td>
<td>152</td>
<td>11.6</td>
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<tr>
<td>631.deepsjeng_s</td>
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<td>264</td>
<td>5.42</td>
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<td>5.42</td>
<td>264</td>
<td>5.42</td>
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<td>641.leela_s</td>
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<td>360</td>
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<td>4.75</td>
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<td>648.exchange2_s</td>
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<tr>
<td>657.xz_s</td>
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<td>294</td>
<td>21.0</td>
<td>295</td>
<td>21.0</td>
<td>295</td>
<td>21.0</td>
</tr>
</tbody>
</table>

SPECspeed2017_int_base = 9.54
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"
LD_LIBRARY_PATH = "/home/cpu2017_u2/lib/ia32:/home/cpu2017_u2/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/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
Yes: 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.
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SPECspeed2017_int_base = 9.54
SPECspeed2017_int_peak = Not Run

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

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
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 9bcde8f2999c33d61f6498e45859ea9
running on bl460-sles15-6252 Fri Apr 12 03:45:42 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 5218 CPU @ 2.30GHz
    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 4 5 6 7 8 9 10 11 12 13 14 15
    physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

From lscpu:
  Architecture:          x86_64
  CPU op-mode(s):        32-bit, 64-bit
  Byte Order:            Little Endian
  CPU(s):                32
  On-line CPU(s) list:   0-31
  Thread(s) per core:    1
  Core(s) per socket:    16
  Socket(s):             2
  NUMA node(s):          2
  Vendor ID:             GenuineIntel
  CPU family:            6
  Model:                 85
  Model name:            Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz
  Stepping:              6
  CPU MHz:               2300.000
  BogoMIPS:              4600.00

(Continued on next page)
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<tbody>
<tr>
<td>Virtualization: VT-x</td>
</tr>
<tr>
<td>L1d cache: 32K</td>
</tr>
<tr>
<td>L1i cache: 32K</td>
</tr>
<tr>
<td>L2 cache: 1024K</td>
</tr>
<tr>
<td>L3 cache: 22528K</td>
</tr>
<tr>
<td>NUMA node0 CPU(s): 0-15</td>
</tr>
<tr>
<td>NUMA node1 CPU(s): 16-31</td>
</tr>
<tr>
<td>Flags:</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

From /proc/cpuinfo cache data

From /proc/meminfo

From /etc/*release* /etc/*version*

From /proc/meminfo

From /etc/*release* /etc/*version*
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Platform Notes (Continued)

```
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15"
```

```
uname -a:
Linux bl460-sles15-6252 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 12 03:44
```

```
SPEC is set to: /home/cpu2017_u2
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda5      xfs    72G   56G   16G  78% /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 i41 02/02/2019
- Memory:
  - 4x UNKNOWN NOT AVAILABLE
  - 12x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666

(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
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
-------------------------------------------------------------------
```

```
CXXC 620.omnetpp_s(base)  623.xalancbmk_s(base)  631.deepsjeng_s(base)
-------------------------------------------------------------------
```

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

**SPECspeed2017_int_base = 9.54**

**SPECspeed2017_int_peak = Not Run**

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**Compiler Version Notes (Continued)**

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:
```plaintext
icc -m64 -std=c11
```

C++ benchmarks:
```plaintext
icpc -m64
```

Fortran benchmarks:
```plaintext
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.xalancmk_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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Hardware Availability: Apr-2019
Software Availability: Feb-2019

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/HPE-Platform-Flags-Intel-V1.2-CLX-revA.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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