**SPEC CPU®2017 Integer Rate Result**

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
**ProLiant BL460c Gen10**  
(2.60 GHz, Intel Xeon Gold 6240Y)

<table>
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<tr>
<td>SPECrate®2017_int_peak = Not Run</td>
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**Copies**

<table>
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<tr>
<th>SPECrate®2017_int_base (214)</th>
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</table>

### Hardware

- **CPU Name:** Intel Xeon Gold 6240Y  
- **Max MHz:** 3900  
- **Nominal:** 2600  
- **Enabled:** 36 cores, 2 chips, 2 threads/core  
- **Orderable:** 1, 2 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:** 192 GB (12 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:** No  
- **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:** None  
- **Power Management:** --
Results Table

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<th>Benchmark</th>
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Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

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
runcpu command invoked through numactl i.e.:
    numactl --interleave=all runcpu <etc>

General Notes

Environment variables set by runcpu before the start of the run:
    LD_LIBRARY_PATH = "/home/cpu2017_u2/lib/ia32:/home/cpu2017_u2/lib/intel64"

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)

(Continued on next page)
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SPECRate®2017_int_base = 214
SPECRate®2017_int_peak = Not Run

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

General Notes (Continued)

is mitigated in the system as tested and documented.

Submitted by: "Bucek, James" <james.bucek@hpe.com>
Submitted: Tue Oct 15 17:05:54 EDT 2019
Submission: cpu2017-20190819-16819.sub

Platform Notes

BIOS Configuration:
   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 Throughput Compute
   Workload Profile set to Custom
   Energy/Performance Bias set to Balanced Performance

Sysinfo program /home/cpu2017_u2/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on bl460-sles15-6244 Wed Apr 24 22:12:35 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 6240C CPU @ 2.60GHz
   2 "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 : 36
      physical 0: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 1: cores 0 1 2 3 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: 2
   Core(s) per socket: 18
   Socket(s): 2
   NUMA node(s): 4
   Vendor ID: GenuineIntel

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

Platform Notes (Continued)

CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6240C 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): 0-8,36-44
NUMA node1 CPU(s): 9-17,45-53
NUMA node2 CPU(s): 18-26,54-62
NUMA node3 CPU(s): 27-35,63-71
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 art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmpref tsc_known_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 f1x8e pxrdm ssm mpx rd_t_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xsaveopt xsavec xsaveopt xsaveopt xsaveopt xsaveopt xsaveopt xsaveopt xsaveopt xsaveopt xsaveopt xsaveopt xsaveopt xsaveopt xsaveopt xsaveopt xsaveopt xsaveopt

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 36 37 38 39 40 41 42 43 44
node 0 size: 47937 MB
node 0 free: 47450 MB
node 1 cpus: 9 10 11 12 13 14 15 16 17 45 46 47 48 49 50 51 52 53
node 1 size: 48380 MB
node 1 free: 48193 MB
node 2 cpus: 18 19 20 21 22 23 24 25 26 54 55 56 57 58 59 60 61 62
node 2 size: 48380 MB
node 2 free: 48235 MB
node 3 cpus: 27 28 29 30 31 32 33 34 35 63 64 65 66 67 68 69 70 71
node 3 size: 48379 MB
node 3 free: 48235 MB
node distances:
node 0 1 2 3

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

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<td>2:</td>
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<tr>
<td>3:</td>
<td>31</td>
<td>31</td>
<td>21</td>
<td>10</td>
</tr>
</tbody>
</table>

From `/proc/meminfo`

- MemTotal: 197711076 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 bl460-sles15-6244 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 24 22:11

SPEC is set to: /home/cpu2017_u2  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/sda3 xfs 144G 94G 50G 66% /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 2933

(Continued on next page)
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Platform Notes (Continued)

The marketing name for the processor in this result, which appears in the CPU name and hardware model areas, is different from sysinfo because a pre-production processor was used. The pre-production processor differs from the production processor in name only.

Compiler Version Notes

```
==============================================================================
C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base)  
       | 525.x264_r(base) 557.xz_r(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.

==============================================================================
C++     | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)  
       | 541.leela_r(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.

==============================================================================
Fortran | 548.exchange2_r(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
```
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### Base Portability Flags

<table>
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<tr>
<th>Benchmark</th>
<th>Flags</th>
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<tr>
<td>perlbench</td>
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<td>gcc</td>
<td>-DSPEC_LP64</td>
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<td>mcf</td>
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<td>omnetpp</td>
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<td>xz</td>
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</table>

### Base Optimization Flags

**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`  

**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:**

- `Wl, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`  
- `-qopt-mem-layout-trans=4`  
- `-nostandard-realloc-lhs -align array32byte`  
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64`  
- `-lqkmalloc`  

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](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-revB.xml](http://www.spec.org/cpu2017/flags/HPE-ic19.0u1-flags-linux64-revB.xml)  
- [http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-CLX-revB.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.

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