## SPEC® CPU2017 Integer Rate Result

### Hewlett Packard Enterprise

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

<table>
<thead>
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### Hardware

- **CPU Name:** Intel Xeon Gold 5218B  
- **Max MHz.:** 3900  
- **Nominal:** 2300  
- **Enabled:** 32 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:** 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:** 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

### Test Details

- **CPU2017 License:** 3  
- **Test Sponsor:** HPE  
- **Tested by:** HPE  
- **Test Date:** Apr-2019  
- **Hardware Availability:** Apr-2019  
- **Software Availability:** Feb-2019

### Performance Results

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### Test Copy Results

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### Copyright

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Hewlett Packard Enterprise (Test Sponsor: HPE)

ProLiant BL460c Gen10 (2.30 GHz, Intel Xeon Gold 5218B)

Hewlett Packard Enterprise

Test Sponsor: HPE

Hardware Availability: Apr-2019

Software Availability: Feb-2019
SPEC CPU2017 Integer Rate Result
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(Test Sponsor: HPE)
ProLiant BL460c Gen10
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SPECrerate2017_int_base = 182
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Results Table

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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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

General Notes (Continued)

is mitigated in the system as tested and documented.

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 9bcd8f2999c33d61f64985e45859ea9
running on bl460-sles15-6252 Sun Apr 14 03:00:43 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)
    64 "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 : 32
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): 64
    On-line CPU(s) list: 0-63
    Thread(s) per core: 2
    Core(s) per socket: 16
    Socket(s): 2
    NUMA node(s): 4
    Vendor ID: GenuineIntel
    CPU family: 6
    Model: 85
    Model name: Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz
    Stepping: 6

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

Platform Notes (Continued)

CPU MHz: 2300.000

BoGoMIPS: 4600.00

Virtualization: VT-x

L1d cache: 32K

L1i cache: 32K

L2 cache: 1024K

L3 cache: 22528K

NUMA node0 CPU(s): 0-7,32-39

NUMA node1 CPU(s): 8-15,40-47

NUMA node2 CPU(s): 16-23,48-55

NUMA node3 CPU(s): 24-31,56-63

Flags: fpu vme de pse tsc msr pae mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdmelyn g dtscp lm constant tsc arch_perfmon pebs bts rep_good xtopology nonstop_tsc cpuid
aperfmon perf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pclid 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 vmni flexpriority ept
vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erts invpcid rtm cmp mpx rdt_a
avx512f avx512dq rdseed advx clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsaves cmp_llc cmp_occil llc cmp_mbb_total cmp_mbb_local
ldarb ibpb dtherm ida arat pln pts pku ospke avx512_vnni arch_capabilities ssbd

/proc/cpuinfo cache data
 cache size : 22528 KB

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 6 732 33 34 35 36 37 38 39
 node 0 size: 47939 MB
 node 0 free: 47537 MB
 node 1 cpus: 8 9 10 11 12 13 14 15 40 41 42 43 44 45 46 47
 node 1 size: 48380 MB
 node 1 free: 48206 MB
 node 2 cpus: 16 17 18 19 20 21 22 23 48 49 50 51 52 53 54 55
 node 2 size: 48380 MB
 node 2 free: 48170 MB
 node 3 cpus: 24 25 26 27 28 29 30 31 56 57 58 59 60 61 62 63
 node 3 size: 48379 MB
 node 3 free: 48234 MB
 node distances:
 node 0 1 2 3
 0 : 10 21 31 31
 1 : 21 10 31 31
 2 : 31 31 10 21
 3 : 31 31 21 10

(Continued on next page)
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Tested by: HPE

Platform Notes (Continued)

From /proc/meminfo
MemTotal: 197714756 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-sles15-6252 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 14 02:59

SPEC is set to: /home/cpu2017_u2

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda5 xfs 72G 42G 30G 59% /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)

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.
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### Compiler Version Notes

```
---
CC  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.
---
CXXC 520.omnetpp_r(base) 523.xalancbenchmark_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.
---
FC  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`

### Base Portability Flags

```
500.perlbench_r: -DSPEC_LP64  -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
```

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**Base Portability Flags (Continued)**

- 523.xalancbmk_r: `-DSPEC_LP64 -DSPEC_LINUX`
- 525.x264_r: `-DSPEC_LP64`
- 531.deepsjeng_r: `-DSPEC_LP64`
- 541.leela_r: `-DSPEC_LP64`
- 548.exchange2_r: `-DSPEC_LP64`
- 557.xz_r: `-DSPEC_LP64`

**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-revA.html](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/HPE-Platform-Flags-Intel-V1.2-CLX-revA.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 2019-04-13 17:30:43-0400.  