# SPEC CPU®2017 Integer Rate Result

## Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL360 Gen10

(2.40 GHz, Intel Xeon Platinum 8260)

**SPECrate®2017_int_base** = 280

**SPECrate®2017_int_peak** = Not Run

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### Hardware

- **CPU Name:** Intel Xeon Platinum 8260
- **Max MHz:** 3900
- **Nominal:** 2400
- **Enabled:** 48 cores, 2 chips, 2 threads/core
- **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 (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:** No
- **Firmware:** HPE BIOS Version U32 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:** --

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## Test Information

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

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### Performance Results

<table>
<thead>
<tr>
<th>SPEC Benchmark</th>
<th>Copies</th>
<th>SPECrate®2017_int_base</th>
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</thead>
<tbody>
<tr>
<td>500.perlbmk_r</td>
<td>96</td>
<td>217</td>
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<td>502.gcc_r</td>
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### Results Table

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**SPECrate®2017_int_base = 280**  
**SPECrate®2017_int_peak = Not Run**

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

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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.

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### 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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**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
  - Enhanced Processor Performance set to Enabled
  - 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 9bce8f2999c33e61f64985e45859ea9
- running on linux-nub3 Wed May 29 07:05:02 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

- From /proc/cpuinfo:
  - model name : Intel(R) Xeon(R) Platinum 8260 CPU @ 2.40GHz
  - 2 "physical id"s (chips)
  - 96 "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 : 24
    - siblings : 48
    - physical 0: cores 0 1 2 3 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
    - physical 1: cores 0 1 2 3 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29

- From lscpu:
  - Architecture: x86_64
  - CPU op-mode(s): 32-bit, 64-bit
  - Byte Order: Little Endian
  - CPU(s): 96
  - On-line CPU(s) list: 0-95
  - Thread(s) per core: 2
  - Core(s) per socket: 24
  - Socket(s): 2
  - NUMA node(s): 4
  - Vendor ID: GenuineIntel
  - CPU family: 6
  - Model: 85
  - Model name: Intel(R) Xeon(R) Platinum 8260 CPU @ 2.40GHz

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

Platform Notes (Continued)

Stepping: 6
CPU MHz: 2400.000
BogoMIPS: 4800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-11,48-59
NUMA node1 CPU(s): 12-23,60-71
NUMA node2 CPU(s): 24-35,72-83
NUMA node3 CPU(s): 36-47,84-95
Flags: fpu vme de pse mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtpcn
lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpcrf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdkg 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
eb cat_l3 cdp_l3 invpcid_single intel_ppnin mba tpr_shadow vnumi flexpriority ept
vpid fsqgbase tsc_adjust bmi1 hle avx2 smep bmi2 ermalms invpcid rtm cqm mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsavec cqm_llc cqm_occup_llc cqm_mbms_total cqm_mbms_local
ibpb ibrs stibp dtherm ida arat pln pts pku ospke avx512_vnni arch_capabilities ssbd

/proc/cpuinfo cache data
  cache size: 36608 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 7 8 9 10 11 48 49 50 51 52 53 54 55 56 57 58 59
  node 0 size: 96349 MB
  node 0 free: 96046 MB
  node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23 60 61 62 63 64 65 66 67 68 69 70 71
  node 1 size: 96763 MB
  node 1 free: 96516 MB
  node 2 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 72 73 74 75 76 77 78 79 80 81 82 83
  node 2 size: 96734 MB
  node 2 free: 96515 MB
  node 3 cpus: 36 37 38 39 40 41 42 43 44 45 46 47 84 85 86 87 88 89 90 91 92 93 94 95
  node 3 size: 96761 MB
  node 3 free: 96606 MB
  node distances:
    node 0 1 2 3
    0: 10 21 31 31
    1: 21 10 31 31
    2: 31 31 10 21

(Continued on next page)
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Platform Notes (Continued)

3: 31 31 21 10

From /proc/meminfo
   MemTotal: 395888132 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 linux-nub3 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 29 07:02

SPEC is set to: /home/cpu2017_u2
   Filesystem   Type  Size  Used Avail Use% Mounted on
   /dev/sda1     xfs  373G  110G  264G  30%  /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 U32 02/02/2019
   Memory:
      24x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2933

(End of data from sysinfo program)
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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.

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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
-gopt-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
-gopt-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
-gopt-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

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
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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