## SPEC CPU®2017 Integer Rate Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant XL170r Gen10  
(2.30 GHz, Intel Xeon Gold 5218)

- **SPECrate®2017_int_base = 178**  
- **SPECrate®2017_int_peak = Not Run**

### Hardware

<table>
<thead>
<tr>
<th>Program</th>
<th>Copies</th>
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<tbody>
<tr>
<td>500.perlbench_r</td>
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<tr>
<td>502.gcc_r</td>
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<tr>
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<td>525.x264_r</td>
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<td>541.leela_r</td>
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<td>548.exchange2_r</td>
<td>64</td>
</tr>
<tr>
<td>557.xz_r</td>
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</tr>
</tbody>
</table>

### Software

- OS: SUSE Linux Enterprise Server 15 (x86_64) SP1  
  Kernel 4.12.14-197.29-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: No
- Firmware: No
- File System: xfs
- System State: Run level 3 (multi-user)
- Base Pointers: 64-bit
- Peak Pointers: Not Applicable
- Other: None
- Power Management: BIOS set to prefer performance at the cost of additional power usage

### CPU2017 License: 3  
Test Sponsor: HPE  
Tested by: HPE  
Test Date: Dec-2019  
Hardware Availability: Jun-2019  
Software Availability: Dec-2019

### Test Date

- **Hardware Availability**: Jun-2019  
- **Software Availability**: Dec-2019

### Other

- **500.perlbench_r**: 133
- **502.gcc_r**: 149
- **505.mcf_r**: 238
- **520.omnetpp_r**: 120
- **523.xalanchmk_r**: 206
- **525.x264_r**: 333
- **531.deepsjeng_r**: 150
- **541.leela_r**: 137
- **548.exchange2_r**: 344
- **557.xz_r**: 118

### Notes

- **CPU Name**: Intel Xeon Gold 5218  
- **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  
- **Memory**: 192 GB (12 x 16 GB 2Rx4 PC4-2933Y-R, running at 2666)  
- **Storage**: 2 x 480 GB SATA SSD, RAID 1  
- **Other**: None

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Standard Performance Evaluation Corporation (info@spec.org)  
https://www.spec.org/
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Results Table

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SPECrate® 2017_int_base = 178
SPECrate® 2017_int_peak = Not Run

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>

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/lib/ia32:/home/cpu2017/je5.0.1-32"
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CPU2017 License: 3
Test Date: Dec-2019
Hardware Availability: Jun-2019
Software Availability: Dec-2019

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.

Platform Notes

BIOS Configuration:
Memory Patrol Scrubbing set to Disabled
LLC Dead Line Allocation set to Disabled
LLC Prefetch set to Enabled
Enhanced Processor Performance set to Enabled
Thermal Configuration set to Maximum Cooling

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed5b1e6e46a485a0011
running on xl170r Thu Dec 19 21:45:56 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
Address sizes: 46 bits physical, 48 bits virtual

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

- **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):** 2
- **Vendor ID:** GenuineIntel
- **CPU family:** 6
- **Model:** 85
- **Model name:** Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz
- **Stepping:** 7
- **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):** 0-15,32-47
- **NUMA node1 CPU(s):** 16-31,48-63
- **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 aperfmperf 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 ablp abm 3nowprefetch cpuid_fault ebpxcpuid lb xz tsc_adjust bmi1 hle avx2 smep bmi2 ibrms invpcid ld vmpid rdtsc pdirtm rdtscp addr监事会 xsaveopt xsaves cqm_llc cqm_occuc_llc cqm_mb_total cqm_mb_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_lld arch_capabilities

From: /proc/cpuinfo

```
cache size : 22528 KB
```

**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 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
- **node 0 size:** 96348 MB
- **node 0 free:** 92131 MB
- **node 1 cpus:** 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
- **node 1 size:** 96731 MB
- **node 1 free:** 92552 MB

(Continued on next page)
Platform Notes (Continued)

node distances:
node 0 1
 0: 10 21
 1: 21 10

From /proc/meminfo
  MemTotal:       197713860 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 xl170r 4.12.14-197.29-default #1 SMP Fri Dec 6 12:08:50 UTC 2019 (ca25711)
  x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

  itlb_multihit:        KVM: Vulnerable
  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: usercopy/swapgs barriers and __user pointer sanitization
  CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
  tsx_async_abort:      Mitigation: Clear CPU buffers; SMT vulnerable

run-level 3 Dec 19 11:55

SPEC is set to: /home/cpu2017
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/sda3      xfs   218G   16G  203G   8% /home

From /sys/devices/virtual/dmi/id
  BIOS:  HPE U38 05/21/2019

(Continued on next page)
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Platform Notes (Continued)

Vendor: HPE
Product: ProLiant XL170r Gen10
Product Family: ProLiant
Serial: CZ3923TV5Q

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.
Memory:
  12x HPE P03050-091 16 GB 2 rank 2933
  4x UNKNOWN NOT AVAILABLE

(End of data from sysinfo program)

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 19.0.4.227 Build 20190416
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 19.0.4.227 Build 20190416
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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
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Base Compiler Invocation

C benchmarks:
```bash
icc -m64 -std=c11
```

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

Fortran benchmarks:
```bash
ifort -m64
```

Base Portability Flags

```bash
500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
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:
```bash
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qqopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```

C++ benchmarks:
```bash
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qqopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```

Fortran benchmarks:
```bash
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qqopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```
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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

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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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