## SPEC CPU2017 Integer Rate Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant ML110 Gen10  
(2.50 GHz, Intel Xeon Gold 5215)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>58.0</th>
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</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>Not Run</td>
</tr>
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### Hardware

- **CPU Name:** Intel Xeon Gold 5215  
- **Max MHz.:** 3400  
- **Nominal:** 2500  
- **Enabled:** 10 cores, 1 chip, 2 threads/core  
- **Orderable:** 1 chip(s)  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **L2:** 1 MB I+D on chip per core  
- **L3:** 13.75 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 96 GB (6 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 U33 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
### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>20</td>
<td>731</td>
<td>43.5</td>
<td>729</td>
<td>43.7</td>
<td>731</td>
<td>43.6</td>
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<tr>
<td>502.gcc_r</td>
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<td>48.7</td>
<td>581</td>
<td>48.7</td>
<td>581</td>
<td>48.7</td>
</tr>
<tr>
<td>505.mcf_r</td>
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<td>417</td>
<td>77.5</td>
<td>416</td>
<td>77.6</td>
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<td>77.7</td>
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<tr>
<td>520.omnetpp_r</td>
<td>20</td>
<td>671</td>
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<td>523.xalancbmk_r</td>
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<td>67.0</td>
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<tr>
<td>525.x264_r</td>
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<td>116</td>
<td>300</td>
<td>117</td>
<td>301</td>
<td>116</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>20</td>
<td>477</td>
<td>48.1</td>
<td>475</td>
<td>48.2</td>
<td>475</td>
<td>48.3</td>
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<tr>
<td>541.leela_r</td>
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<td>45.2</td>
<td>735</td>
<td>45.1</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>20</td>
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<td>102</td>
<td>512</td>
<td>102</td>
<td>512</td>
<td>102</td>
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<tr>
<td>557.xz_r</td>
<td>20</td>
<td>564</td>
<td>38.3</td>
<td>563</td>
<td>38.3</td>
<td>564</td>
<td>38.3</td>
</tr>
</tbody>
</table>

SPECrate2017_int_base = 58.0

SPECrate2017_int_peak = Not Run

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

### Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset 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)
## SPEC CPU2017 Integer Rate Result

**Test Sponsor:** HPE  
**Hardware Availability:** Apr-2019  
**Software Availability:** Feb-2019

<table>
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### SPECrate2017_int_base = 58.0

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### General Notes (Continued)

is mitigated in the system as tested and documented.

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### 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 ml110-sles15 Thu May 2 23:19:31 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 5215 CPU @ 2.50GHz
  1 "physical id"s (chips)
  20 "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 : 10
siblings : 20
physical 0: cores 0 1 2 3 4 8 9 10 11 12
```

**From lscpu:**

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 20
On-line CPU(s) list: 0-19
Thread(s) per core: 2
Core(s) per socket: 10
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5215 CPU @ 2.50GHz
Stepping: 6
CPU MHz: 2500.000
```

(Continued on next page)
Platform Notes (Continued)

BogoMIPS: 5000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 14080K
NUMA node0 CPU(s): 0-19
Flags: fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dtsc ACPI mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtsscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf 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_13 cdp_13 invpcid_single intel_pipin mba tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ersed msix invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local ibpb ibrs stibp dtherm ida arat pin pts ksu ospke avx512_vnni arch_capabilities ssbd

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
   available: 1 nodes (0)
   node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
   node 0 size: 96323 MB
   node 0 free: 95799 MB
   node distances:
      node 0
         0: 10

From /proc/meminfo
   MemTotal: 98635448 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"

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Platform Notes (Continued)

uname -a:
    Linux ml110-sles15 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 2 23:16

SPEC is set to: /home/cpu2017_u2
    Filesystem     Type Size  Used Avail Use% Mounted on
    /dev/sda3      xfs  313G  41G  272G  14% /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 U33 02/02/2019
    Memory:
    6x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666

(End of data from sysinfo program)

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.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.

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**Compiler Version Notes (Continued)**

```
FC  548.exchange2_r(base)
```

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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`
- `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:
  - `-W1,-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`

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<td>C++ benchmarks:</td>
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<tr>
<td>-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div</td>
</tr>
<tr>
<td>-qopt-mem-layout-trans=4</td>
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<td>-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64</td>
</tr>
<tr>
<td>-lqkmalloc</td>
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<tr>
<td>Fortran benchmarks:</td>
</tr>
<tr>
<td>-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div</td>
</tr>
<tr>
<td>-qopt-mem-layout-trans=4</td>
</tr>
<tr>
<td>-nostandard-realloc-lhs -align array32byte</td>
</tr>
<tr>
<td>-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64</td>
</tr>
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<td>-lqkmalloc</td>
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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-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