# SPEC® CPU2017 Integer Rate Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL380 Gen10  
(1.80 GHz, Intel Xeon Gold 6222V)

**SPECrater2017_int_base = 199**  
**SPECrater2017_int_peak = Not Run**

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
</table>
| OS: SUSE Linux Enterprise Server 15 (x86_64)  
  Kernel 4.12.14-23-default | CPU Name: Intel Xeon Gold 6222V  
  Max MHz.: 3600  
  Nominal: 1800 |
| Compiler: C/C++: Version 19.0.1.144 of Intel C/C++  
  Compiler Build 20181018 for Linux; Fortran: Version 19.0.1.144 of Intel Fortran  
  Compiler Build 20181018 for Linux |  
  Enabled: 40 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: 27.5 MB I+D on chip per chip  
  Other: None  
  Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R, running at 2400)  
  Storage: 1 x 960 GB SATA SSD, RAID 0  
  Other: None |
| Parallel: No  
  Firmware: HPE BIOS Version U30 04/18/2019 released Apr-2019  
  File System: xfs  
  System State: Run level 3 (multi-user)  
  Base Pointers: 64-bit  
  Peak Pointers: Not Applicable  
  Other: None |  
  Test Date: Jul-2019  
  Hardware Availability: Apr-2019  
  Software Availability: Nov-2018 |

### Copies

<table>
<thead>
<tr>
<th>SPECrate2017_int_base (199)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r 80</td>
</tr>
<tr>
<td>154</td>
</tr>
<tr>
<td>164</td>
</tr>
</tbody>
</table>

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Standard Performance Evaluation Corporation (info@spec.org)  
https://www.spec.org/
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<table>
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<tr>
<th>Benchmark</th>
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<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>500.perlbench_r</td>
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<td>825</td>
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<td><strong>826</strong></td>
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<tr>
<td>502.gcc_r</td>
<td>80</td>
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<td>168</td>
<td><strong>664</strong></td>
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<td>662</td>
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<tr>
<td>505.mcf_r</td>
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<td>487</td>
<td>266</td>
<td><strong>487</strong></td>
<td>265</td>
<td>488</td>
<td>265</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>80</td>
<td>755</td>
<td>139</td>
<td>752</td>
<td>140</td>
<td><strong>752</strong></td>
<td>140</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>80</td>
<td>383</td>
<td>221</td>
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<td>220</td>
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<td>220</td>
</tr>
<tr>
<td>525.x264_r</td>
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<td>400</td>
<td>350</td>
<td>401</td>
<td>352</td>
<td>398</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>80</td>
<td>559</td>
<td>164</td>
<td><strong>559</strong></td>
<td>164</td>
<td>560</td>
<td>164</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>80</td>
<td>883</td>
<td>150</td>
<td>874</td>
<td>152</td>
<td><strong>878</strong></td>
<td>151</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>80</td>
<td>610</td>
<td>343</td>
<td><strong>612</strong></td>
<td>342</td>
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<tr>
<td>557.xz_r</td>
<td>80</td>
<td>633</td>
<td>136</td>
<td><strong>633</strong></td>
<td>136</td>
<td>633</td>
<td>136</td>
</tr>
</tbody>
</table>

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/lib/ia32:/home/cpu2017/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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<th>SPECrate2017_int_peak</th>
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<tbody>
<tr>
<td>199</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Test Date</th>
<th>Jul-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Nov-2018</td>
</tr>
</tbody>
</table>

### 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/bin/sysinfo

Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
running on dl380-clx-sles15hs Tue Jul 16 05:48:15 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

```plaintext
model name : Intel(R) Xeon(R) Gold 6222V CPU @ 1.80GHz  
2 "physical id"s (chips)  
80 "processors"
```

cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)

```plaintext
cpu cores : 20  
siblings : 40  
physical 0: cores 0 1 2 3 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28  
physical 1: cores 0 1 2 3 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
```

From lscpu:

```plaintext
Architecture: x86_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 80  
On-line CPU(s) list: 0-79  
Thread(s) per core: 2  
Core(s) per socket: 20  
Socket(s): 2  
NUMA node(s): 4  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Gold 6222V CPU @ 1.80GHz
```

(Continued on next page)
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Platform Notes (Continued)

Stepping: 7
CPU MHz: 1800.000
BogoMIPS: 3600.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 28160K
NUMA node0 CPU(s): 0-9,40-49
NUMA node1 CPU(s): 10-19,50-59
NUMA node2 CPU(s): 20-29,60-69
NUMA node3 CPU(s): 30-39,70-79
Flags: fpu vme de pse mre mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpset rdtscp
lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfperf 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
ebp cat_l3 cdp_l3 invpcid_single intel_pni mba tpr_shadow vmm_flexpriority ept
vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ームs invpcid rtm cqm mpx rdt_a
avx512f avx512dq rdseed adx smap cllushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsaves xsave cx16 cpuid xsavecl qcl qm occup llc qm mb_total qm mb_local
ibpb ibrs stibp dt e e ar ida ar pln pts pk ospk avx512-vnni arch_capabilities ssbd

/proc/cpuinfo cache data
  cache size: 28160 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 40 41 42 43 44 45 46 47 48 49
  node 0 size: 193046 MB
  node 0 free: 192686 MB
  node 1 cpus: 10 11 12 13 14 15 16 17 18 19 50 51 52 53 54 55 56 57 58 59
  node 1 size: 193532 MB
  node 1 free: 193308 MB
  node 2 cpus: 20 21 22 23 24 25 26 27 28 29 60 61 62 63 64 65 66 67 68 69
  node 2 size: 193532 MB
  node 2 free: 193178 MB
  node 3 cpus: 30 31 32 33 34 35 36 37 38 39 70 71 72 73 74 75 76 77 78 79
  node 3 size: 193304 MB
  node 3 free: 193083 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)
Platform Notes (Continued)

3: 31 31 21 10

From /proc/meminfo
MemTotal: 791977152 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 dl380-clx-sles15hs 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_PW

run-level 3 Jul 16 05:46

SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 476G 91G 386G 19% /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 U30 04/18/2019
Memory:
24x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2933, configured at 2400

(End of data from sysinfo program)
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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 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 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 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 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 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 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-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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