### SPEC CPU®2017 Integer Rate Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL20 Gen10  
(4.00 GHz, Intel Xeon E-2274G)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>33.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

#### Hardware

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon E-2274G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz:</td>
<td>4900</td>
</tr>
<tr>
<td>Nominal:</td>
<td>4000</td>
</tr>
<tr>
<td>Enabled:</td>
<td>4 cores, 1 chip, 2 threads/core</td>
</tr>
<tr>
<td>Orderable:</td>
<td>1 chip</td>
</tr>
<tr>
<td>Cache L1:</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2:</td>
<td>256 KB I+D on chip per core</td>
</tr>
<tr>
<td>L3:</td>
<td>8 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>64 GB (4 x 16 GB 2Rx8 PC4-2666V-U)</td>
</tr>
<tr>
<td>Storage:</td>
<td>1 x 400 GB SATA SSD, RAID 0</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
</tbody>
</table>

#### Software

<table>
<thead>
<tr>
<th>OS:</th>
<th>SUSE Linux Enterprise Server 15 (x86_64) SP1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kernel 4.12.14-195-default</td>
</tr>
<tr>
<td>Compiler:</td>
<td>C/C++: Version 19.0.1.144 of Intel C/C++</td>
</tr>
<tr>
<td></td>
<td>Compiler Build 20181018 for Linux;</td>
</tr>
<tr>
<td></td>
<td>Fortran: Version 19.0.1.144 of Intel Fortran</td>
</tr>
<tr>
<td></td>
<td>Compiler Build 20181018 for Linux</td>
</tr>
<tr>
<td>Firmware:</td>
<td>HPE BIOS Version U43 09/05/2019 released Sep-2019</td>
</tr>
<tr>
<td>File System:</td>
<td>xfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Power Management:</td>
<td>--</td>
</tr>
</tbody>
</table>

#### Copies

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>8</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>8</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>8</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>8</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>8</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>8</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>8</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>8</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>8</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>8</td>
</tr>
</tbody>
</table>

---

**Test Date:** Oct-2019  
**Hardware Availability:** Nov-2019  
**Tested by:** HPE  
**Software Availability:** Oct-2019
SPEC CPU®2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL20 Gen10
(4.00 GHz, Intel Xeon E-2274G)

SPECrate®2017_int_base = 33.9
SPECrate®2017_int_peak = Not Run

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>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>8</td>
<td>451</td>
<td>28.2</td>
<td>453</td>
<td>28.1</td>
<td>455</td>
<td>28.0</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>8</td>
<td>371</td>
<td>30.5</td>
<td>376</td>
<td>30.1</td>
<td>375</td>
<td>30.2</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>8</td>
<td>292</td>
<td>44.3</td>
<td>294</td>
<td>44.0</td>
<td>293</td>
<td>44.2</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>8</td>
<td>555</td>
<td>18.9</td>
<td>557</td>
<td>18.9</td>
<td>555</td>
<td>18.9</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>8</td>
<td>220</td>
<td>38.4</td>
<td>221</td>
<td>38.2</td>
<td>220</td>
<td>38.4</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>8</td>
<td>182</td>
<td>76.9</td>
<td>182</td>
<td>77.1</td>
<td>182</td>
<td>76.9</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>8</td>
<td>314</td>
<td>29.2</td>
<td>314</td>
<td>29.2</td>
<td>315</td>
<td>29.1</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>8</td>
<td>507</td>
<td>26.2</td>
<td>507</td>
<td>26.1</td>
<td>508</td>
<td>26.1</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>8</td>
<td>343</td>
<td>61.1</td>
<td>344</td>
<td>60.9</td>
<td>343</td>
<td>61.1</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>8</td>
<td>421</td>
<td>20.5</td>
<td>421</td>
<td>20.5</td>
<td>421</td>
<td>20.5</td>
</tr>
</tbody>
</table>

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

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
Yes: 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.
SPEC CPU®2017 Integer Rate Result
Copyright 2017-2019 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL20 Gen10
(4.00 GHz, Intel Xeon E-2274G)

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

SPECrater®2017_int_base = 33.9
SPECrater®2017_int_peak = Not Run

Platform Notes

BIOS Configuration:
Thermal Configuration set to Maximum Cooling
LLC prefetch set to Enabled
Workload Profile set to General Throughput Compute
Minimum Processor Idle Power Core C-State set to C1E
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-vb4y Sat Oct 19 04:40:17 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) E-2274G CPU @ 4.00GHz
 1 "physical id"s (chips)
 8 "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 : 4
siblings : 8
physical 0: cores 0 1 2 3

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 39 bits physical, 48 bits virtual
CPU(s): 8
On-line CPU(s) list: 0-7
Thread(s) per core: 2
Core(s) per socket: 4
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 158
Model name: Intel(R) Xeon(R) E-2274G CPU @ 4.00GHz
Stepping: 10
CPU MHz: 4000.000
BogoMIPS: 8016.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 8192K
NUMA node0 CPU(s): 0-7

(Continued on next page)
Platform Notes (Continued)

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 aperf perf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invpcid_single pti ssbd ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bm1 hle avx2 smep bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt intel_pt xsaveopt xsavec xgetbv1 xsave vmm dtherm ida arat pln pts md_clear flush_l1d

/procd/cpuinfo cache data
  cache size : 8192 KB

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
  node 0 size: 64022 MB
  node 0 free: 63473 MB
  node distances:
    node   0
    0:  10

From /proc/meminfo
  MemTotal:       65559328 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 linux-vb4y 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
  x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization

(Continued on next page)
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL20 Gen10  
(4.00 GHz, Intel Xeon E-2274G)  

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

SPECrater 2017_int_base = 33.9  
SPECrater 2017_int_peak = Not Run  

Platform Notes (Continued)  
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation,  
IBPB: conditional, IBRS_FW, STIBP: conditional, RSB filling  

run-level 3 Oct 19 04:38  
SPEC is set to: /home/cpu2017  
Filesistem Type Size Used Avail Use% Mounted on  
/dev/sda3 xfs 270G 62G 208G 23% /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 U43 09/05/2019  
Memory:  
4x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666  

(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 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 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 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 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 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
**SPEC CPU®2017 Integer Rate Result**

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL20 Gen10  
(4.00 GHz, Intel Xeon E-2274G)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>33.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

- **Test Date:** Oct-2019  
- **Hardware Availability:** Nov-2019  
- **Software Availability:** Oct-2019

### 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:**
  - `-Wl,-z,muldefs -xCORE-AVX2 -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-AVX2 -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-AVX2 -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`
<table>
<thead>
<tr>
<th>SPEC CPU®2017 Integer Rate Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copyright 2017-2019 Standard Performance Evaluation Corporation</td>
</tr>
</tbody>
</table>

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL20 Gen10  
(4.00 GHz, Intel Xeon E-2274G)  

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 33.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_peak = Not Run</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Sponsor: HPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability: Nov-2019</td>
</tr>
<tr>
<td>Software Availability: Oct-2019</td>
</tr>
</tbody>
</table>

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

---

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

Test Date: Oct-2019  
Hardware Availability: Nov-2019  
Software Availability: Oct-2019  

SPEC CPU and SPECrate are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.0.5 on 2019-10-19 04:40:17-0400.  
Report generated on 2019-12-10 14:53:11 by CPU2017 PDF formatter v6255.  
Originally published on 2019-12-10.